ELECTRONIC GOVERNMENT ADOPTION BASED ON CITIZEN-CENTRIC APPROACH IN REGIONAL GOVERNMENT IN DEVELOPING COUNTRIES: THE CASE OF KURDISTAN REGION OF IRAQ (KRI)

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Abstract

In the latter part of the 20th century ICT has been broadly employed in an effort to enhance the quality of service provision to the public. In the light of this, both public and private sectors have recognised the necessity of adopting technology and its applications in their potential. However, using ICT facilities for development facing various factors such as; establishing technical infrastructures, users and employees' awareness, legal framework for interactions with public authorities, security, privacy, trust, digital divide, along with organizational issues should be taken into consideration. Therefore, all these challenges should be considered and discussed if continuing progress is to be maintained because missing a few issues and only discussing some of them will lead to a waste of resources.

Currently, most of the developing countries suffer from the lack of transparency, accountability, and increasing corruption in government administration. E-government has appeared as a potential solution to reduce the level of corruption by enhancing the services to its citizens effectively and efficiently. Furthermore, e-government has the potential to enhance and organise the relationships between stakeholders which include; citizens, government, and business. So, thriving implementation of e-government will improve accountability, efficiency, and effectiveness of government institutions and also may decrease corruption at both federal and regional levels.

This research proposes a novel e-government stage model based on the citizen's participation of improvements in the delivery of governmental services. In other words, find the importance of putting citizens' insights and their requirements in the context of e-government development along with the potential use of a multi-channel delivery of services. It is expected that the model will enable more transparent and effective communications with businesses. Thereby, reducing bureaucracy and by implication, may result in a reduction in corruption. To accomplish this, the researcher investigates in the literature to find out the existing models and experiences in the area of e-government in order to identify the drawbacks reasons and limitations of the failure. The researcher also set out to investigate and analyse

one of the well established e-government stage models, to identify possible opportunities to adopt for use in regional government in developing countries.

The proposed model has been evaluated by adapting the Analytic Hierarchy Process (AHP) decision making method and integrating it with the SWOT analysis method. SWOT factors were identified through interviews with experts from various ministries in the KRG. The proposed model were evaluated by adopting a qualitative case study strategy such as IT projects, taking the expert's opinion of the proposed model by using qualitative method.

Moreover the researcher, by using a qualitative case study strategy such as the Kurdistan Region of Iraq (KRI), observes the proposed model in various government institutions in the KRI. The analysis of pragmatic data leads to a narrative inclusive model for e-government initiatives in the public sector that can be assisted in different ways. The advantage of this model is to decrease the uncertainty of e-government implementation in the public sector by recognising the consequence of the institutional readiness, adoption processes, the needs of ICT tools, and the factors that influence the implementation process. The model might also assist policy makers in government to offer a clear vision for e-government. Ultimately, any conclusions could be useful to other researchers in the developing world who are seeking to explore the potential of similar initiatives.

Dedication: This thesis dedicated to the KRG-Iraq

Abbreviations

AHP	Analytic Hierarchy Process
APR	Automatic Plate Recognition
ASA	Adaptive Security Appliances
B2B	Business to Business
BC	Before Christmas
CCU	Central Control Unit
CCTV	Close Circuit Television
CEO	Chief Executive Officer
CIA	Central Intelligence Agency
CIO	Central Information Categorisation
CPR	Central Population Registration
CP	Compromise Programming
CRM	Customer Relationship Management
DDG	Director Deputy of General
DDCC	Director General of Developmental Coordination and Cooperation
DG	Director of General
DMB	Digital Media Broadcasting
DOI	Digital Opportunity Index
DRS	Data Recording System
DSS	Decision Support System
EIU	Economic Intelligence Unit
eGAP	Electronic Government Action Plan
ELECTRE	Elimination Choice Expressing Reality
EDVO	Evolution Data Only/Evolution Data Optimized
GPRS	Global Packet Radio Service
GPS	Global Positioning System
G2C	Government to Citizen
G2E	Government to Employee
G2G	Government to Government
G2P	Government to Public

GCC	Gulf Cooperation Council
GRP	Government Resource Planning
HCDP	Human Capacity Development Program
HMRC	Her Majesty Revenue and Customs
IANS	Indo-Asian News Service
ICT	Information and Communications Technology
IHSES	Iraq Household Socio-Economic Survey
IMD	International Institute for Management Development
IMF	International Monetary Fund
INVIL	Information Network Village
IN	Intelligent Nation
IS	Information System
ITU	International Telecommunications union
ITF	Iraqi Trust Fund
KADO	Korea Agency for Digital Opportunity and Promotion
KBI	Kurdistan Board of Investment
KPI	Key Performance Indicator
KRG	Kurdistan Regional Government
KRI	Kurdistan Region of Iraq
KRSO	Kurdistan Regional Statistical Office
MAUT	Multi-Attribute Utility Theory
MC	Mobile communications
MCDA	Multi-Criteria Decision Making
MHE	Ministry of Higher Education and Scientific Research
MOP	Ministry of Planning
MOPDC	Ministry of Planning and Development Cooperation
MOTAC	Ministry of Transportation and Communication
MPLS	Multiprotocol Label Switching
MTI	ministry of trade and industry
NAO	National Audit Office
NGO	None Governmental Organizations.
NIA	National Information Society Agency

NTC	National Trust Council
OECD	Organisation for Economic Cooperation and Development
OPEN	Online Procedure Enhancement
OSPEC	One-Stop Public Entertainment Licensing Centre
PDA	Personal Digital Assistance
PPR	Public Sector Process Rebuilding
PSI	Public Service Infrastructure
PWC	Price Waterhouse Cooper
PROMETHEE	Preference Ranking Organisation Method for Environment Evaluation
SMG	Seoul Municipality Government
SISP	Strategic Information System Plan
SO	Significant Objective
SSM	Soft System Methodology
TI	Transparency International
SWOT	Strength, Weakness, Opportunity, and Threat
TOPSIS	Technique for Order Preference by Similarity to Ideal Situation
UAE	United Arab Emirate
UMTS	Universal Mobile Telecommunications System
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nation Development Program
VLAN	Virtual Local Area Network
VSAT	Very Small Aperture Terminal
WAP	Wireless Application Protocol
WiBro	Wireless Broadband
WiFi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network
WLL	Wireless local loop
WOG	Whole Of Government
WWAN	Wireless Wide Area Network

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Introduction

Information and communication technology can be considered as a vital enabler towards the development of any society. With the majority of countries across the globe having embraced new technologies and having connections to the internet and the world wide web, more and more governments nowadays (be it national or local) look at engaging these technologies in an effort to improve the way they offer services to citizens. Some do so in order to improve the channels through which they communicate and interact with their citizens, while others look forward to improving the efficiency of delivery of services and consequently introduce savings in the utilisation of resources that could be diverted into creating further value adding initiatives.

The advancement of technology and, more specifically that of ICT have encouraged the public sector to utilise ICT to support its operations and functions. However, new concepts and opportunities for the government to utilise ICT in expanding their services and functions have arrived along with the emergence of the internet (Evans and Yen, 2005). Novel terms and expressions such as digital, electronic, online government, Net State, e-business (Peled, 2001; Mandelson, 1999; Lawson, 1998), and others, have been invented to define this modern phenomenon. Nowadays, we are experiencing more "E"s than we ever anticipated. Most of the concepts in our lives associated with "E" format, such as e-democracy, e-government, e-learning, e-business, e-entertainment, e-commerce, e-library, e-auctions, e-market, and others. All these provide traditional services but in the most digitised, automated and proficient way in which to promote and encourage government authorities to provide more and more electronic services. Ultimately, the term e-government has gained a broader acceptance.

ICT is no longer useful just to support back-end operations; it is also useful for facilitating front-end processes with business and citizens (Calvin et al., 2008). ICT continues to be a key driver in changing the way most economies and societies function. The broadening use of ICT is having a deep influence on the way people live and work (Berce et al., 2008). The use of ICT has a significant role in e-

government initiatives to establish effective and efficient communication in the provision of services to citizens and other users (Krishnaiah, 2008; Curtin et al., 2003). E-government initiatives can enhance the quality of services delivered to citizens, employees and businesses. It will also reinforce the connection between public officials and their communities and thereby make government more transparent and accountable to citizens (Tan et al., 2005). In fact, the main role will be to influence in this continuous dynamic process for a citizen. Thus, citizens can play a key role in developing a seamless service of provision. Therefore, to improve and enhance the quality of delivery of services, an e-government initiative will be the best practice with respect to citizens' perspectives, since it is the primary way of transforming government performance and business processes.

Over the latter half of the first decade of the 21st century, many developing countries have been attempting to imitate the western models and introduce e-government services in their portfolio, expecting savings, efficiency and a drive for modernization across their states. As far as literature is concerned there are many challenges facing the implementation of successful e-government systems in developed and in developing countries (Sarantis et al., 2011; Al-Nagi and Hamdan, 2009), due to the uncoordinated e-government efforts (Ferro and Sorrentino, 2010). Various governmental institutions have developed their own system independent of other institutions. Therefore, cooperation and integration are a fundamental issue facing the strategy of e-government. More to the point, decentralized effort with little efficiency are spent richly. Other challenges that have emerged are cultural attitudes, lack of management, political process, legal framework, ICT literacy among citizens and employees, citizens' knowledge, citizens' awareness, and the effect of the digital divide (Mousavi et al., 2008). In order to overcome these drawbacks, important efforts are required and resources will have to be devoted to the system. This research therefore will contribute to the investigation of an e-government model for regional government in developing countries in four ways. Firstly, the researcher investigates in the literature to find out the existing models and experiences in the area of e-government in order to identify the drawbacks reasons and limitations of the failure. Secondly, investigating various case studies among developed and developing countries in order to understand and learn lessons from their success and failure factors. Furthermore, to study any adjustments to the models

that have been affected due to cultural, regional, etc. characteristics. To achieve this, diverse case studies, strategic plans, and investigation on the opportunity of the adoption of a developed model in the research case which will be considered. Thirdly, an improved model for delivering e-government services will be proposed. This will be based on the findings of stages one and two above and would aim to reflect citizens' needs and demands better than the existing ones. The model will be reviewed by experts and stakeholders, through consideration of the specific requirements of a case of a regional government. Finally, the proposed model will be evaluated by applying both SWOT-AHP analysis methods with expert perspectives through qualitative data collection and some IT case studies from current research case-Kurdistan Regional Government.

Aim of the research

The aim of this research is, to propose an e-government stage model based on citizen's perspectives and desires for planning at a strategic level and implementing the delivery of e-government services at regional levels in developing countries. The research will consider citizens' needs, the government aims, infrastructure capabilities and the potential for integration of new technologies such as the semantic web and communications technology as media for better services provision.

The key research questions

1- What are the current government services offered by the regional government in the developing countries?
2- What type of channel delivery of services is provided by the regional government in the developing countries?
3- What are the key improvements required from the governments' and citizens' points of view in improving the delivery of services?
4- Would the proposed stage model contribute to enhance quality in the delivery of government services in the context of regional government?

Research objectives

In order to accomplish the aim of the research, the following research objectives must be addressed.

1- Review and investigate the literature, in the field of e-systems in general and e-government implementation process in particular.
2- Study of the present state affairs of government in the KRI, by identifying the main limitations and advantages for the current government.
3- To identify and investigate the current channel of delivery of services provided by the Kurdistan Regional Government (KRG).
4- Identify the key elements required from the governments' and citizens' perspectives on enhancing the delivery of services.
5- Recognizing and studying example cases to learn lessons and support requirements of implementation of e-government.
6- To propose an e-government stage model, with the help of literature review and critical analyses, this can be used to support the implementation of the e-government stage model.
7- Evaluation and testing of the proposed e-government stage model follows two steps:
    - The first step: the e-government stage model evaluates using SWOT-AHP analysis method in order to offer a quantitative measure of significance of each factor in decision making.
    - The second step: in order to evaluate the stage model, the accuracy of the proposed model via pragmatic case studies of the experiences of government IT projects. The perspectives of IT experts can also be used to support the feasibility of the proposed model for implementation.

Table 1 illustrates the overall summary of the methodology used in this research.

Table 1: Summary of the research methodology

Research Topics	Research Methodology
1-Researching into electronic government concepts, definitions, and background of the study.	Level of analysis: • Literature review • Pilot Survey
2-Investigating how services provided by the current government and proposing measures against inadequacies, also identify the availability of the current technology.	Level of analysis: • Evaluating the features and weakness of the current government • Proposing measures against inadequacies
3- Researching into the relevant models by studying the various cases from different countries (developed and of course developing countries).	Level of analysis: • Identify relevant models to response the measurement of previous step • Requirement specifications of an informative and an integrated website.
4-Development of workable procedures for implementing the e-government stage model.	Level of analysis: • Empirical and conceptual analysis of e-government model of regional government in developing countries. • The requirement of designing model for the system
5-Validating and evaluating the proposed model by applying evaluation methods and experts' opinion with some cases on the IT projects that being implemented in the KRG.	Level of analysis: • SWOT-AHP will be used for evaluation. • Expert's perspectives on the proposed model with justification in relation to some case studies.
6- Conclusion and recommendations for future research.	• Research findings along with its limitations. • Recommendation to provide concrete guidance to government officials and researchers.

Methodology

Foremost, to investigate and review the current state affairs needs empirical data, government archives, and other information to come up with clear pictures. Further, to evaluate the proposed e-government stage model requires experts' perspectives to become a narrative stage model along with addressing some IT project case studies.

There are two types of methodologies in information system development namely; object-oriented and structured approach (Hoffer et al., 2002). The first approach has been adopted for the development of IT and it differs from structured approach. The structured approaches are not reusable, while the object-oriented are reusable approaches, and consequently improve the quality of design and systems analysis.

Currently, this approach is commonly used in software research and development, and it explores different levels of the software process such as design, analysis and implementation. This implies that this approach can be used in various cases and on different systems. Therefore, this research is objective-oriented, in other words after the successful completion of this research the proposed model could be adopted by other regional governments in developing countries.

Furthermore, researching in Information System (IS) needs multi-dimensional methodology (Gil-Garcia, 2005) because an information system is multi-facet. Creswell (2003) argues that tackling participation issues requires mixed-method approaches, because single-dimensional methods are not suitable for a multi-facet approach, and e-government is a multi-dimensional approach. Therefore, the researcher considers a mixed-approach to meet research objectives with nested function (quantitative and qualitative).

Mixed-method involves open-ended and close-ended questions (Creswell, 2003) and data will be collected through gathering numeric and text information via questionnaires and interviews. Hence, the result database will signify both quantitative and qualitative information. The primary data will be collected through pilot survey questionnaires from ordinary citizens (see appendix A) to identify a number of service usages, a number of internet usages, types of service channels, and other relevant information. However, to identify how citizens see government services, a qualitative method will be used such as interviews, observation, focus groups and discourse analysis (Shuttleworth, 2008). In addition, offering overlapping information, gives the potential to check the outcome from various perceptions (Ramchander, 2004). In order to find out the number of channels utilised by the government for service provision, data will also be collected through pilot survey-interviews and questionnaires but with government employees and officials (see appendix B). The needs for this stage of the data collection is to help verify the level of the ability of these institution's readiness for e-government adoption and how they plan to develop any proposed system. Other data will be collected from published and unpublished government sources.

However, because the research is dealing with human beings and it is not an experimental research, the methodology that will be applied throughout the process will involve stakeholders including; citizens, businesses, and government. Therefore,

based on the above, a mixed-dimensional method will be used to fulfil the legitimate status of the research design and methodology. In order to collect this data, and information from fieldwork effectively, the following steps will be used to gather this data and information for obtaining the aim and objectives of this research.

1- A pilot survey is used as part of the scale development methodology in order to validate and identify the current state of affairs and circumstances in KRI, and also to view the understanding of citizens and the awareness of e-government. The researcher conducted a survey on Erbil city as a main sample of this research as an initial phase, because it ranks amongst the best for this criteria in fields related to area size, population, a strategic place, as a capital of the Kurdistan region and the location of the government cabinet. For the pilot survey, the researcher identified some KRG agencies such as; Erbil governorate (local government), Erbil municipality, Erbil Tax land, Erbil traffic police office, the department of foreign relationships, and the department of IT at the council of ministries. Two types of questionnaires were carried out, the first questionnaire was for 30 questions which were distributed among ordinary citizens who were visiting the above government agencies, a total of 400 forms were distributed and 270 or 67.5% survey responses rate were received, and the second questionnaire was 23 questions which were distributed amongst 150 employees in the above agencies and a total number of 96 or 64% survey responses rate were received. In addition, interviews were carried out with some of the government's director of general and directors.

2- To evaluate and validate the feasibility of the proposed e-government stage model, the qualitative method will be used to collect experts' perspectives along with their recommendations. This survey's interviews were carried out in various establishments in the KRG with six experts in the IT field and government services provision, along with some case studies on implemented IT projects. The strategy of this interview was to gather primary qualitative data from interviewees (experts, advisors, and directors) by using both structured and semi-structured method. The questions were requested, and explained for interviewees by the researcher. The interview was mainly accomplished in the Kurdish language and recorded, and then it was translated into the English language (see appendix C). The questions on this scheme are comprised into both closed-ended and open-ended questions. The close-ended questions, the response of the interviewee, will be limited to yes or no answer.

However, where there are open-ended questions, the response of the interviewee will not be limited to a short answer, but with more explanation based on the interview question. In other words the interviewee will give details and explain their answers in a sentence or maybe a paragraph or more, this type will be the main approach used in this interview.

The significant goals of this type of interview:

1- To collect data and information on the e-readiness and IT infrastructure within the public sector in the KRG.

2- To recognise the challenges which influence e-government implementation in the KRG.

3- To see any institutional, human and technological issues that could influence the implementation of e-government.

4- To examine the implementation process of IT projects in the KRG.

5- To identify any gap between government plans and the citizens' desires of any IT project.

6- This questionnaire interview provides the opportunity to obtain experts' opinions to enhance the model which will impact the feasibility of the e-government stage model for implementation.

The following sketch is depicted in figure 1, shows the purposes of each questionnaire survey method and how both sets of purposes guide to the accomplishment of the final aim.

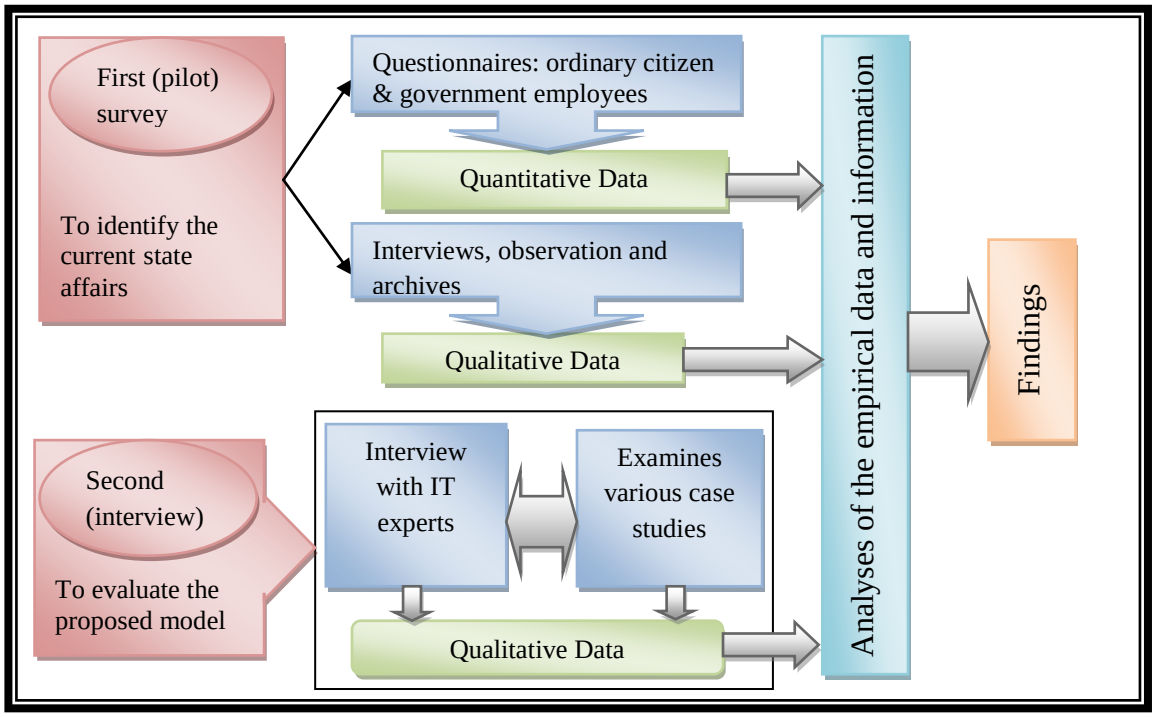

Figure 1: The purpose of the survey

Contribution to Knowledge

The researcher has conducted intensive reviews, critical analyses in the literature along with analyses of some existing e-government developments in developing countries. Furthermore some of the best existing e-government systems in the world along with the limitations and barriers influencing failure of e-governments were examined. The above led the researcher in proposing an enhanced e-government stage model for regional governments in developing countries. This comprises a potential solution leading to effective e-government implementation and enriching the impact in this area of research in e-government. The focus is well balanced between technological, cultural and managerial aspects comprising a major contribution in terms of computing research output.

From literature review and the study of existing practice and models, this research identifies missing elements in traditional e-government models that would prove essential for implementation in developing countries. These elements are missing in the most widely accepted e-government models and have not been considered

before. The most significant of those are, ICT infrastructure, security, trust, citizens' awareness, citizens' knowledge, political process, legal framework, administration, and IT literacy at the educational establishments as the role to promote people to enhance their IT skills (Sarantis et al., 2011; Al-Nagi and Hamdan, 2009).

The model proposed in this research considers most of the limitations in two stages, namely, initial and an enhancement stage. A key limitation of existing models is the lack of a citizen centred approach which might lead to failure in engaging citizens to participate in e-government. In addition, there is not a single model that contains all the required elements, and the current models have failed to address all the challenges faced by developing countries into account.

The research explores the concept of multi-channel delivery of services, including traditional channels along with digital channels, in order to give the citizens a choice of usable channels to perform their needs. Another important contribution, which has not been highlighted in literature, is the ability of the proposed model to offer the means of limiting interventions by politicians in public administration. This is a serious problem that is particularly common in developing countries and is a key drawback in e-government implementation there.

A vital factor in e-government development is that of relating systems to citizens' demands in participating and using e-government services. It is essential that promoting, encouraging and allowing citizens to communicate and interact with e-government, and these are further enhancement offered by this research. A further finding of this research is the exploration of the use of mobile communications as an effective channel for e-government accessibility and adoption in Iraqi Kurdistan, where the penetration of mobile communications exceeds the landline communications.

A unique feature of this research is that it is the first one to focus on e-government in the KRI, which is one of the most troubled countries in the world at present. Despite, all the limitations imposed by war conditions and the poor infrastructure, the KRI features special cultural and geographical characteristics beyond the nature of the regional government that the research focuses on. Moreover, this research makes an important contribution to the world e-government literature through an insightful case study of the KRG e-government initiative, which is seen as a flagship project in Iraq in general and in Kurdistan in particular. It also contributes vitally to the

creation of effective strategies and policies that the Kurdistan government needs so that it can investigate problems and challenges in a Kurdistan government implementation. Any conclusions could be useful to other researchers in the developing world who are seeking to explore the potential of similar initiatives. Apart from that, in Iraq generally and Kurdistan in particular, such type of research on e-government has not yet been conducted.

Thesis structure

This thesis comprises of six integrated chapters that outline the process of the research which has been conducted in a time period of three years. Each individual chapter tackles a precise issue connected to the aims and objectives of this research. The following sections summarise and explain the fundamental of these six chapters.

Chapter 1: Literature Review

This chapter reviews the information on the e-government developments in order to attain a broad idea in terms of success or failure of a system, also to identify shortages and limitations of current e-government systems. The chapter begins by addressing various definitions of e-government, and its structure. It outlines the relationship between e-government and e-business. The use of a multi-channel delivery of service is important to convince the entire stakeholders in the society which are categorised and explained in this chapter. Then the chapter concentrates on the importance of the social inclusion and its relationship to e-government. The chapter ends with analyses of various e-government systems in Asian countries such as; south Korea, Singapore, Bahrain, Dubai, and Jordan.

Chapter 2: ICT and E-government in Kurdistan Region of Iraq

This chapter focuses on the current situation in KRI in terms of gender characteristics, computerization and internet, online services, ICT infrastructure, and e-readiness. The chapter ends by investigating the main drawbacks and advantages of the present system in KRI, with analysing the challenges that influence e-

government implementation; such as technological, economic, societal and political challenges.

Chapter 3: Critical analysis and discussions

There are vast numbers of e-government stage models in the literature; however there is little research on e-government stage models for regional governments in developing countries. This chapter aims to critically analyse and explains various e-government stage models in the literature in order to identify the gaps and their limitations. This critical review and analyses are essential in order to learn lessons and find out the opportunity for adopting a developed model in the case of KRI. This chapter tackles this issue by analysing one of the established e-government stage models such as the UK, to identify possible opportunities to adopt for use in regional government in developing countries. The chapter ends with critical factors that affect the adoption of the UK e-government stage model in the case of KRI.

Chapter 4: Proposing an electronic government stage model

The aim of this chapter is to fill out the limitations and gaps along with lessons that have been learned from both theoretical and existing e-government stage models which were stated in chapter 3. Consequently, a model is proposed based on citizen-centric approach for regional government in developing countries. The chapter also proposes an organizational framework for managing an e-government sector in regional government in developing countries to show the process of e-services of the proposed e-government stage model. The chapter ends with one of the channels of service provision to citizens, such as wireless/mobile channel to identify driver's identity in real time.

Chapter 5: Evaluation of the proposed e-government stage model

This chapter portrays and evaluates the proposed model with the help of a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis method. The analysed factors are identified by the interviewee's perspectives and evaluated with the help of

the Analytic Hierarchy Process (AHP) decision support method. The combination of SWOT-AHP provides a quantitative measure of significance of each factor in decision making. The chapter describes the method for the evaluation of the e - government stage model. Then, this chapter addresses various evaluation methodologies that might be used in the e-government system evaluation. The concept of the AHP is presented and its calculation technique. The chapter then outlines the adoption of both SWOT and AHP analysis methods and a decision support method respectively. In addition, the chapter validates the proposed model using the analysis data that was collected from interviews with IT experts in the KRG. The chapter ends with analyses of some cases in the field of IT projects that have been implemented in the KRG.

Chapter 6: Conclusions and Future Research

This chapter aims to present the research findings along with limitations that occurred during the period of this research. Then the chapter ends with conclusions and recommendations for future research.

Chapter One: Literature Review

This chapter considers the viewpoint of a case study with a review of the variety of academic literature available to date on e-government initiatives in the area of interest of this research. The researcher outlines and reviews various definitions of e-government concepts at the beginning of this chapter. Next, in section 1.2 reviews the development of e-government and determines the concept of e-services as the fundamental element of e-government while offering a number of proposals for electronic services effectively in both the supply and demand side. Section 1.3, explains the relationship between e-government and e-business. Section 1.4, portrays the link between e-government and mobile government. In section 1.5, the researcher addresses the use of a multi-channel delivery of service and its' importance to convince the entire stakeholders in the society. In section 1.6, the researcher analyses and focuses on the influences of the social inclusion and its relationship to e-government. The last section in this chapter reviews various e-government systems in Asian countries such as; South Korea, Singapore, Bahrain, Dubai, and Jordan to identify limitations and hurdles impacting on the failures and successes of e-government implementation. Furthermore, it will assist with learning lessons from the existing e-government system to enrich e-government developments.

1.1 E-government definitions

There are a variety of definitions of e-government due to various viewpoints from experts and researchers. Hence, there is no common definition of e-government to convince a wider acceptance. According to the literature, various definitions of e-government have been addressed. For instance, e-government is defined as the use of information and communications technology (ICT) to transform government by making it more accessible, result-oriented, efficient, effective, and accountable (OECD, 2003). Such an implementation includes a range of activities from providing greater access to government information to promoting civic engagement in

providing development opportunities. Others defined e-government as the process of making activities and functions completed effectively and efficiently with and through other people Gulick and Urwick (1937).

Gil-Garcia and Martinez (2005) defined e-government as the intensive use of IT for service provision to their citizens, and the enhancement of managerial efficiency and the encouragement of democratic values and mechanisms. This definition argues that the provision of services is not only through the use of technology, but also enhancing the management process in order to be more transparent and more efficient (Tan, 2005; Heeks, 2001). On the other hand, Holzer and Tae Kim (2005) identified both digital government and digital democracy provides services to citizens and the contributions of citizens in government respectively. The maturity level of e-government will lead to e-democracy by engaging citizens to participate in decision making and to opt for its representative (e-voting) through electronic channels. E-government involves a sort of activity by offering better access to government information and encouraging civic engagement to provide development opportunities. Consequently, citizens, business, and government institutions are all benefiting from the electronic government system (World Bank Group, 2009). The important factors are related to citizens' demands and their perception to participate and utilise e-government services. It is essential to promote and allow citizens to communicate and participate in e-government. In this regard, Fang (2002) defined e-governance as the direct contribution of the people in decision making and participating in political activities such as e-democracy, and e-voting. In a broader definition e-governance will cover parliament, Judiciary functions, government, citizens' contribution, political parties, and organizations.

Whereas e-government is subject to the same risks as e-business, and e-government could function within different restrictions. Mainly, the business occurs merely with a part of the inhabitants, and they can select the how and the when they perform its needs. However, the government should deal with everyone (Stibbe, 2005). Thus, due to the vast number of transactions and users along with the sensitivity of this field, such as privacy of citizens' data or government's confidential information, protecting citizen's information and governmental networks is more important than businesses. Further, the protection of citizens' privacy data and disclosure of their information, impacts on the trust in government. In this regard, (Conklin, 2007;

Ebrahim and Irani, 2005) mentioned the importance of sufficient security and privacy in e-government, and their impact on successful e-government. It is noted that, in reality, e-government itself has become a major contributor to the issue of privacy and security, because of their massive interaction with stakeholders. However, Tambouris et al. (2001), and National Research Council (2002) describe e-government as the use of Internet-based technologies, network, security techniques, and communication infrastructure by government institutions. Which have the capability to change the effectiveness, security and accountability of information and transaction exchanges with intra-government, along with their citizens, business and other divisions of government authorities.

Nevertheless, a widespread definition of e-government covers the use of ICT by public sector organizations as it consists of a variety of potential delivery channel services (Shareef et al., 2010a; Heeks, 2006). One of the components that can be enhanced, are services to the public in implementing multi-channel delivery of services. Multi-channel delivery of services can be defined as having a perspective in place for the use of diversity of service channels along with a single public delivery of service or the utilisation of various channels for various deliveries of service processes (Pieterson and Ebbers, 2008). The main idea is to enable users to select their preferred channel for its communication with the government anytime and anywhere to accomplish their needs. However, these new channels should be associated with the conventional channels such as face-to-face, telephone, and post (Fleur et al., 2010). Therefore, according to the above definitions electronic government cannot be defined as only digitizing the information services and publishing on the website, but should also consider improving the quality of services in order to be more accessible, effective and efficient, also the potential of multi-channel delivery of services in order to make the entire stakeholders capable of selecting an appropriate channel for services they desire.

The OECD defined e-government as the use of ICTs, precisely the internet like a tool to accomplish a better government; for instance, e-government is more about government than about electronics. It facilitates better policy returns, superior connection with citizens along with higher quality services (OECD, 2003). Furthermore, the World Bank's website provides a general definition of e-government as"… *E-Government refers to the use by government agencies of*

information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions"… World Bank Group (2009). In the 21st century e-government provides a great drive to move forward with superior quality, effective financial resources, more efficient services and enhanced relationships between stakeholders and government (Fang, 2002).

Consequently, E-government is a dynamic continuous service provision process which makes availability of services to the society via technology along with the potential of multi-channel delivery of services; such as internet, telephone, wireless devices, and other communication systems, along with an effective management process (Shareef et al., 2010a). The sketch of an e - government definition is depicted in figure 2.

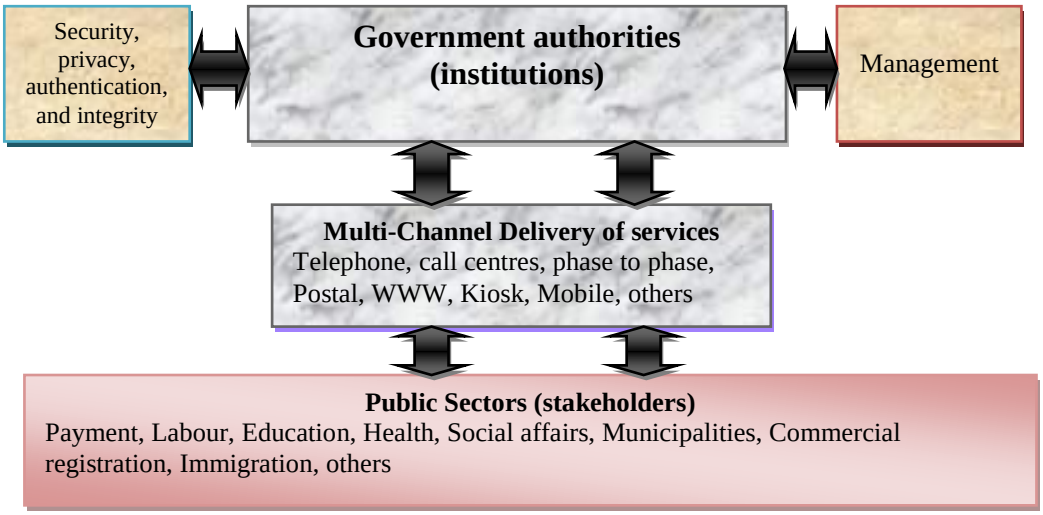

Figure 2: Sketch of e-government definition

1.2 Electronic government structure

In the 21st century e-government provided a great drive to move forward with superior quality, effective financial resource, more efficient services and enhanced relationship between stakeholders and government (Fang, 2002). However, Heeks (2008) found in his study, the success and failure levels of e-government in developing and transitional countries, shows that 35% are total failures in which the implementation were deserted or the systems were not implemented such as in East Africa, 50% can be measured to be partial failures in which some aims of the implementation were not achieved such as in Eastern Europe and approximately 15% are successes, where most of the aims of the stakeholders were achieved. Although, e-government initiatives could be successful if the government authority convinces the entire stakeholders (Savvas et al., 2009). The most important feature of e-government is how to encourage and motivate citizens and businesses closer to their government; also how to prepare innovative channels that will be useful for the community. Furthermore, the implementation of e-government depends on the objectives, culture, political situation, and others of the region. In other words the situation varies from region to region (Carter and Weerakkody, 2008). There is a diversity of e-government implementation structures in the literature, but a more commonly known structure (Shareef et al., 2010b; Al Hujran and Chatfield, 2008) is depicted in figure 3.

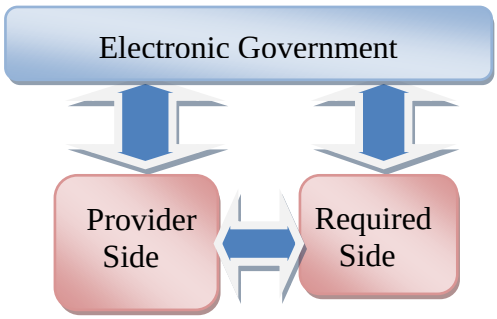

Figure 3: A conceptual structure for e-government

This framework structure can be classified into two classes. The first class is the provider or supply-side which copies issues that are vital to the provision of public

services, for example local, state, federal or national government. Consequently, this perspective finds out technological, economical, and societal issues such as IT infrastructure, resistance to change, financial resource, and personnel skills that influence the implementation of e-government services (Coursey et al., 2007; Norris and Moon, 2005). All these challenges will be discussed in more detail in section 2.6. The main challenge to the supply side for government authority is how to deliver e-services to the stakeholders. Electronic servicing is similar to e-government and has been defined in various ways; it can be observed that they all agree regarding the role of ICT in facilitating the service delivery. Rowley (2006) defined e-service as the efforts to provide services through the use of IT; this e-service involves e-tailing, support from user and the delivery of services. In this definition it recognizes three elements. The first element is the side that provides the service, the second is the channel that is used to deliver the service, and the third element is the receiver of the service.

The second side is the required or demand-side which concentrates on the consumers/users of public services; this class explores some issues such as culture, trust, citizens participation, awareness, and experience that influence consumers/users to utilise e-government services (Carter and Bélanger, 2005).

The successful e-government implementation will be achieved when the communication and interaction expand and cover the entire society sectors. Various scholars discussed the influence and effectiveness of electronic communication and interactions among government institutions and along with citizens and businesses. Some of the researchers suggested three classes of communication (Lee et al., 2011; Nour et al., 2008; Reddick, 2004; Seifert and Petersen, 2002), such as; government to government (G2G), government to citizen (G2C), and government to Business (G2B). However, others suggested four classes of communications (UN, 2005; Wiskott, 2002; Wimmer and Tambouris, 2002) which added the fourth class which is government to employee (G2E). Apart from the acceptance of most of the researchers, that these communications have direct impact on the success of e-government implementation. The other class which is Government to Public (G2P) will integrate the entire communications. G2P is the interaction and communication between external truisms with government. For instance applying for a visa or acquiring something legal or other legislations. Therefore, the entire interaction and

communication classes are playing a significant role in implementing and developing e-government. Hence, government authorities should consider all the classes along with their sectors while adopting e-government.

1.3 E-government and E-Business

Electronic government has become a vital driver for growth, particularly in developing countries. Successful implementation and development of e-government should be associated with the business development process. There are various factors influencing the implementation of e-government services among business organisations in regional governments in developing countries. For instance, knowledge divide, social culture, and public awareness, amongst various other obstacles to implementation. To address electronic business it is necessary to understand the idea of e-business. Li (2007) defines an e-business as "*provides a thorough and reflective introduction to business strategies and organisational innovations in the Internet world"* this new term gives the integrated framework for business to understand the varied and rapidly changing business phenomena in the e-field.

Exploiting e-business in an accurate manner needs the formulation of an e-business model that will serve as the substantial step in needs analysis for e-business information systems (Gordijn and Akkermans, 2001). The industry lacks sufficient methods for devising these types of desires. Methods from the ICT analysis systems field usually have a strong technology base and typically do not mirror business considerations very well. In the meantime, business science programmes often lack the rigour needed for the development of information systems. The integration of ICT and business would most surely benefit the industry, because this integration impacts significantly on a successful e-business. Business process changes the public sector mainly by amalgamation of business processes, digitization and automation of some activities and the removal of some unnecessary ones. ICT has had significant influence on how firms do business with their business collaborators. These influences are based on electronic commerce; the term e-commerce in a slight sense can be expressed as it is a process of buying products from providers and selling to customers using ICTs (Nurmilaakso, 2008).

The use of ICT in service delivery decreases the cost of transactions, for example physically visiting the front desk has a higher transaction cost than the use of the internet. In recent years the worldwide economy has become increasingly more competitive as business and consumers desire greater choice. To carry on in this environment, firms must effectively deliver superior customer services and products. Also increase cooperation among their employees, partners and providers to offer extra efficiency. Firms are containing these business demands via the adoption of e-business technologies. This adoption is driven by the augmented awareness of the huge scope afforded by e-business technologies (Watt, 2002), and their capability to noticeably increase the productivity and efficiency of existing business processes and systems. In addition, the development of e-business is connected directly to that of e-government. ICT has the potential to improve business processes and the value of governmental services, and also the relationship between government and business G2B. Current trends in ICT aspire to use the development of platforms for supporting G2B relationships by means of service provision and knowledge exchange (Stemberger and Jaklic, 2007; Singh et al., 2005). Though, full benefiting of ICT requires government institutions to know and recognize how to combat various challenges, such as incompatibility, public awareness, ICT complexity, and knowledge divide which are not the only, and not the most difficult challenges to defeat. One of the main challenges is to evolve business process for enterprise information management (Williams et al. 2006).

The idea of business is initiated in the field of e-commerce in which companies attempted to copy the successful business models. The wide spread of digital technology particularly, the Internet and World Wide Web provide facilities, low cost, and usable forms of electronic business. Some scholars describe the business model in terms of economic values that are altered between business partners. The most common definition is by Timmers (1998) that defines a business model as *"an architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various actors; and description of the sources of revenues"*. He also mentioned to the definition of the marketing before defining a business model. In order to know how competitive advantage will be built, and the positioning, also to know the marketing mix and which product market strategy is followed. He defined

marketing model as "*A business model; and the marketing strategy of the business actor under consideration.* However, Weill and Vitale (2001) define a business model as a relationship and roles among companies and citizens, consumers, partners, and providers that recognize the main stream of products, money, information, and the main benefits for contributors.

There has been an ever growing and rapid literature base on business models among academics, expertises, research centres and consultants (Rappa, 2010; Osterwalder and Pigneur, 2002; Timmers, 1998). The simple business can be explained as; a firm constructs goods or services and sells it to people/ consumers, if the income from sales is above the cost of operation from sales, then the company will make money and profit if all the process goes well. Business models are the means by which an enterprise can maintain it and generate income, and also is employed in describing how firms will adopt this. The use of new technologies supports interoperability and integration between business networks and defines the way these networks play a key role in developing e-business (McGann et al., 2002). Over the last few years, business models have been a significant topic in different disciplines and mainly e-business (Pateli and Giaglis, 2003). The term business model is expressed in two ways (Gordijn et al., 2005). The first way is taxonomy such as auction, e-shop, or malls, (Timmers, 1998; Rappa, 2010; Weill and Vitale, 2001). The second way as the conceptual model, for example people do business described as a reference model or a meta-model (Osterwalder and Pigneur, 2002; Afuah and Tucci, 2003; Applegate, 2001). Other models can be more complicated such as broadcasting through radio and TV, in which the presenter is part of a complex network of advertiser, listener or viewer, content creator and, distributor (Rappa, 2010). All these taxonomies of business models aim to be more oriented towards the front-end and, visible to the consumer. There is no recognised general classification, which implies that there are few theoretical bases for business models research and application in the context of e-government. The business model in the context of e-government requires containing the network trends of coordination within itself and between institutions. Several classifications have been proposed in the literature regarding e-business models (Janssen et al., 2008; Gordijn and Pigneur, 2005; Pateli and Giaglis, 2003; Rappa, 2010; Timmers, 1998). Rappa (2010) categorizes a business model and their attributes into nine groups, these models can be utilised in

various ways, a company can combine several various models according to their priority and internet business strategy.

1.4 E-government and M-government

In section 1.3, the researcher explained the relationship between e-government and e-business and its close interaction. In this section, the researcher focuses on the link between e-government and mobile government (m-government). Mobile government is similar to e-government which uses ICTs to deliver services to the stakeholders effectively and efficiently. However, the ICTs that are used in m-government is limited to wireless/mobile technologies **(**Lallana, 2008) like mobile phones or smart phones, personal digital assistants (PDA), laptops which can be connected to wireless local area networks (WLAN). Mobile government can support and make public information and services available any time anywhere for all stakeholders. Today's challenge is to move towards mobile government, because in several countries, particularly in developing countries the ICT infrastructure is not sufficient, and wired phone service is not a viable option. In other words, the fixed internet line is few and mobile penetration has increased tremendously. Also m-government does not require expensive media and office space. One of the main points in favour of m-government is that the mobile phone penetration is reaching 83%, exceeding fixed telephone users in Europe (IDABC, 2006).

Kushchu and Kuscu (2003) consider m-government as a strategy to be implemented, and should be utilised in all kinds of wireless and mobile technology. The services, applications, and technology are provided to enhance benefits to all users of e-government, such as business, citizens, and government institutions. (Sandberg, 2009; Cilingir and Kushchu, 2004) suggest that wireless/mobile technology services could be considered as an add-on to other e-government services, a supplement instead of being a substitute. However, m-government is not only a supplementary channel to e-government but it is the major component or channel in e-government (Shareef et al., 2010a).

Mobile government of those countries who have already initiated e-government, and highly developed in ICT infrastructure is inevitable. Thus it emerges as one of the extra value-added characteristic for the integrated and flexible data communication

exchange mechanism among government organizations. However, countries who have not initiated e-government or are at the early stage of the implementation process, and who have their ICT infrastructure not as developed requirement, (Kushchu and Kuscu, 2003). Such countries may have benefited more depending on the type of the concerns that faced by the governments. In the developing country m-government application may become a vital means of reaching the people and encouraging communications particularly when used in an isolated area (Shareef et al., 2010a). In countries where mobile penetration is high therefore, the ability to get to the isolated area may be considered as a vital feature of m-government. The Kurdistan region of Iraq for example, exhibits some attractive features; overall attempts to implement e-government are still at the early stages, meanwhile, the mobile infrastructure is at a more advanced stage. Therefore, the government authority can employ some mobile application to service its citizens while implementing the integrated e - government system. In this regard, in section 4.3, the researcher proposes one of the applications of the mobile channel.

1.5 Categorization of multi-channel delivery of services

E-government will be successful by enabling multi-channel delivery of services (Shareef et al., 2010a; Pieterson and Ebbers, 2008), and hence facilitating the entire stakeholder to benefit from the e - system. The evolution is based on different types of channels which the users preferred and influenced by the circumstances. For example, the nature of the services required, or is required for direct interaction, or person to person interaction. Research (IAD, 2004) shows that, the channels can be classified into three categories: directness, accessibility, and the modality of channels. The researcher sees that there are many more channels which exist and can be classed into six categories (Shareef et al., 2010a), such as directness, accessibility, speed, security and privacy, availability, and the modality (Shareef, et. al. 2010a; Pieterson and Ebbers, 2008; Hosny and Arreymbi, 2007; Germanakos, et. al., 2005; Sørensen, 2003; Zalesak, 2003). The first category, directness of channel, is that in which requirement is determined, whether the user wants an interaction or not. The interaction happens in two ways:

1. One way communication, in which an individual or organization sends out information, and,
2. Two way communication, when a citizen or an organization sends out information and get a response to the information,

The second category is the accessibility of the channel. In this class the requirement verifies the services which can be accessed through at least one channel, i.e. mobile phone, PC, and others, (Hosny and Arreymbi, 2007). The third category depends on the time that the user spends to get the service (Germanakos, et. al., 2005). In other words; the citizen selects an appropriate channel based on how fast the service is delivered (Shareef, et. al. 2010a,). The fourth category is based on how the channel is secured and protects the citizen or organization's information, such as transferring money which requires stringent security and protection. The fifth category is based on the opening hours of the channel (Pieterson and Ebbers, 2008). For example if the channel service is face to face interaction, the opening hours would be the same as usual opening hours of the regular offices. But channels such as web-based services or interactive voice response systems that do not involve face to face interaction may have 24/7 service. The last channel service is the modalities of channel, where the citizens are allowed accessing the channel online anytime, and anywhere (Sørensen, 2003; Zalesak, 2003).

Government can provide and implement multi-channel delivery of services in order to reduce the cost and increase the efficiency and effectiveness of the services. A multi-channel strategy, can deal with two main issues faced by the public bodies in today's environment (Shareef et al., 2010a; EC, 2004). The first aim is improving the services offered to the citizens and the second is to reduce the costs of offering these services. Citizen require services to be reliable, flexible, accessible, complete, perfect, easy and secure, that varies from one person to another. For example the disabled person needs specific requirements (EC, 2004). Governmental organizations are faced with providing more citizen-oriented services; citizens can be served through multi-channels, such as physical offices, web-based, call centres, and others (Shareef et al., 2010a; Janssen and Wagenaar, 2002). One of the significant aims of the government is to provide services to its citizens seamlessly; these services should be in a high level of efficiency, usability, friendliness, accessibility, and effectively, unfortunately these requirements are not often fulfilled. Problems such as busy

phone lines, long queues, and continuous redirections to other departments, all show the functioning of traditional communication channels, telephone, mail, visits to the office, giving an overview to overall quality of services.

Citizens require services with less cost and efficient service delivery, ICT decreases the transaction costs by allowing direct transactions, transaction costs emerge due to the interactions among organisations and citizens, for example physically visiting front desks, has a higher transaction cost than the use of internet (EC, 2004). Galal-Edeen et al. (2008) argue about a gap between the governments preferred channel of interaction and the channels that the citizen preferred, and also discusses the criteria for evaluation of multi-channels from the citizen's perspective to improve the citizen's participation with government. The evaluation is based on different types of channels which the users preferred and is influenced by the circumstances.

The spread use of the Internet as a service channel guided many people to believe that the internet would replace all other service channels or render them obsolete, but Peterson and Dijk (2002) believes that all other channels still exist and the use of the internet in many cases has not lead to obstacles in the use of other service channels. Various government institutions in the world are already providing e-government services through various delivery channels apart from the web. Nevertheless, ubiquitous access and multi-channel possibilities is the fundamental feature for developing new options and services. The advancement of ICT together with the growth of wireless/mobile communication has provided new avenues for many organisations to meet their challenges by engineering their front-end and back-end office. The new ways have been developed through different types of channels allowing citizens to access services anywhere, and anytime (Naqvi and Al-Shihi, 2009). In other words citizens can get information and services whenever they want. In this situation mobile/wireless communication plays an important role as omnipresent technology (Tan, 2006; Zalesak, 2003; Sadeh, 2002). For instance, the fast dissemination of mobile technology e.g. laptops, PDAs, mobile phones, along with SMS, MMS, e-mail, and networking services, provide many new potential opportunities for the mobilisation of interaction (Lee and Kim, 2009; Sorenson, 2003; Kakihara and Sørensen, 2002). The type of multi-channels with their benefits for citizens and providers are depicted in table 2 (EC, 2004).

Table 2: The type of service channels with their benefits to citizens and providers

Channels	Citizen benefits	Provider's benefits
Call centre	Provide services on a 24/7 basis -Provides various services -Services can be accessed from home or at work	Cheaper than the traditional channel
E-mail, automated responses	-Provide services on a 24/7 bases -Services can be accessed from home or the office	- Required no personal contact, less expensive, and more transparent - Can be sent one too many
E-mail, manual response	-Provides services from home or the office.	-Inexpensive than 'in person' contact
Digital TV	-Provide services on a 24/7 bases -Services can be accessed from home or the office	- High possible diffusion - can elevate e- inclusion - can be provided one-to-many
Voice Response System	-Provide services on a 24/7 bases -Accessed from home or the office for the services	-Less expensive -elevated diffusion of access equipments
Mobile devices	-Provides services regardless of the location -Provides varied channels service, SMS, e-mail, and access to internet,	- promote and increase e-Inclusion
SMS	-Provide services on a 24/7 bases -Accessed from home or the office for the services	-Announcing services -Less expensive - Required no personal contact
Kiosk	Provide services on a 24/7 bases	-Simplicity in use
Telephone	- Accessed from home or the office for the services	-Very large Diffusion Use
Web Site	- Provide services on a 24/7 bases -Accessed from home or the office for the services	-Involve huge amount of Information - Obtaining services through internet and Less expensive

However, Malone and Yates (1987) argue that the disintermediation is often found in decreasing the transaction cost. Thus, the disintermediation direct interaction between service providers/institutions and users/citizens possibly at a lower cost, unnecessary activities are redundant and removed. This perception is challenged because the focus on cost will underestimate the range of facilitating the services that is offered by intermediaries (Janssen and Sol, 2000; Sarkar et al., 1995) thus required for creating an integrated service delivery. Therefore, disintermediation for current channels may not be an unimportant step and needs to be part of a conscious strategy for interacting with citizens. Janssen and Verbraeck, (2005) and Giaglis et al., (2002) defined that the disintermediation argument concentrates only on the cost of intermediation and does not take into account the benefits that can be obtained by

using intermediaries. The intermediaries are aimed at bridging and reducing the gap between service provider and the service requesters. The next section investigates the role of public in e-government.

1.6 Society inclusion and electronic government

Since the time of electronic-based society has arrived E-government initiatives have become more and more important and can provide services more effectively and efficiently to their citizens and the entire stakeholders (Shirazi et al., 2010). ICT has a significant role in an e-government initiative to establish effective and efficient communication with the public and businesses (Krishnaiah, 2008). Further, in the 21st century e-government provides a great drive to move forward with superior quality, effective financial resource, more efficient services and enhanced relationship between stakeholders and government (Tan et al., 2005). To introduce any services, government should prepare and make society aware of the service. Embark on public enlightened campaigns on the uses and advantages of e-services. The fundamental concern of e-government is to be successful and to provide wider accessibility. The government authority should be able to encourage citizens to participate in e-government that will be a vital factor to successful e-government process (Fitzgerald, 2005; Janet, 2004). Some researchers found that awareness is a key factor of the progress of e-government. Jaeger (2004) founds that the lack of awareness in the UK was a problem influenced e-government development since citizen and business didn't know that the services are already exist.

The citizen desires to be sited at the centre of the development and the provision of electronic public services (Verdegem and Verleye, 2009). Concurrently, it is essential to evaluate and investigate the influence of the services to the citizens in order to identify the level of citizen's satisfaction. Guiding and raising citizen's awareness of the how and the way to use information online is beneficial for them. In other words enriching e-government processes with training, raising awareness and putting free telephone numbers on the website, offering discounts and, free charge for some services in order to encourage citizens to use the services. This will be achieved by publishing leaflets, advertising (Elnaghi et al., 2008; Lootah, 2005), newsletters, SMS promotional campaigns, radio, TV, magazines and using

multimedia communication in various languages to make the services more interesting for citizens. In addition, encouraging individuals to contribute to e-government improvement, and holding seminars to motivate society to get involved in the system. Initiating a citizen-centric based approach (Sahraoui, 2005) for training in order for capable citizens to be familiar with the system. This is an imperative issue of successful e-government and thus will build public trust in government (Tolbert and Mossberger, 2006).

The researcher believes that society inclusion in the e - government system is surrounded by political, organizational, technological and social issues along with the lack of contribution of the citizens. These must be considered and be treated carefully to facilitate these issues (Löfstedt, 2007; Belanger and Carter, 2006; Brown and Schelin, 2005; Yoon, 2005). Additionally, e-government should provide training courses aimed to increase employees' skills and clerk's knowledge of the fundamentals of e-government and the strategies, thus reducing the digital gap. More importantly, it is vital to merging online training for external users, employees, citizen awareness (Calvin et al., 2008) and motivation. E-learning can be used in the area of e-government, in other words the relationship between the government and its employees G2E, which is an effective way to provide an e-learning (Ndou, 2004). Providing e-learning courses will bring a great profit and save the government, in terms of cost and time, this is the main factor which impacts on the stakeholder participation in the system.

The government officials have the potential to develop the relationships, apart from G2C and, G2B. Government to its employees (G2E) is another relationship that influences the effectiveness of cooperation among government entities. The lack of cooperation among government entities and its employees thus impact on the failure of the system (Fleur et al., 2010). E-government needs cross-entity cooperation, due to operational requirements for scale, consistency, and integration. The first operation is the management of the technology in which requires a certain level of attempt and ability to achieve that could be difficult in certain government entities. The second operation requires some consistency in approach across government entities. The third operation is the need for integration of the system across government entities (Christina and Scharf, 2008). A government's relationship with its stakeholders will align most of the aims of e-government to convenience the

citizen and its participation in the decision making. In its main strategic aim the government can deliver the service to its citizens, rather than visiting government offices, by using the digital means of the internet and communications while assisting e-government systems in the field of e-election and e-voting to expand the range of the community participation in the democratic process.

Moreover, the use of ICT has a significant role of e-government to establish effective and efficient communications to provide services to the stakeholders (Krishnaiah, 2008; Curtin et al., 2003). The key objective of e-government implementation is citizen's satisfaction and acceptance of the system. This will be attained by involving citizens into the electronic climate. However, the main risks of progressing e-government are the formation of social division and also the technological exclusion (Jellinek, 2010; Tassabehji, 2005). This division occurred due to the lack of trust in government and that commonly happens in the countries with a lack of democracy and transparency (Shareef et al., 2010b).

In the last decades the broad and fast development of telecommunication and computerized technologies has had a massive influence on changing our society. The construction, management and utilisation of information and knowledge are observed to be the heart of social evolution and financial productivity (Verdegem and Verleye, 2009). Demonstrating such concepts for instance, information society and the so called "knowledge economy" (Castells, 2000). Therefore, it can be pointed out that a citizen-centric approach should be a main part of the e-government strategy. Citizen's enquiry for services is a must, since both citizens and services are altering sustainability within their expectations (Centeno et al., 2004), that requires more investigation. In other words the perception of citizens and their expectations and experiences towards technology-enabled citizen service and the applications are essential (Van Dijk et al., 2008).

In this regards, according to the report has been published on the topic of "*social inclusion through ICT*" on the local governments in England. Communities and Local government (2008) mentioned the requirement for tackling social inclusion via ICT, in which three key objectives should be considered such as; awareness, accessibility, and skills and training. In addition, the report indicated the role of parents in acting as an enabler by encouraging awareness, accessibility, and skills and training. Moreover, the study carried out by Nunes et al. (2002) illustrates the

aspects of e-government with special attention on how local authorities are handling the shift to the information society. The study findings revealed that emerging e-learning is a main factor to facilitate social inclusion and assure e-democracy. However, according to the seminar at City University in London, Jellinek (2010), Ellen Helsper presented various theories in her presentation regarding the "*Digital inclusion*" and "*social exclusion*". She mentioned the theory named "*neutralisation*" in which the use of technology itself did not considerably make a citizen's situation better, but that does not apply for those who do not employ the technology. The social gap will enlarge; hence digital inclusion is desired easily to sustain "*the status quo of inequality*". Ellen furthermore mentioned another theory called "*vicious cycle*" in which if everybody engages with technology that will affect the social gap, due to the social deprived who will not employ the internet, for instance, for education but might use it for gaming. Accordingly, when we talk about digital inclusion that includes diverse aspects, for instance the use of digital technology alters according to the person's capability and its desires. Human beings behave differently with technology and also use it differently. Therefore, in terms of social inclusion, there are various factors which influence the above argument. For instance discrimination faced by certain parts of the society, demography, poverty, level of education, and elderly people also with a personal situation such as disability (Bernhard, 2010; Belanger and Carter, 2006).

1.7 E-government in Asian countries

There are broad researches focused on e-government in developed countries, relatively, small number of researches investigated e-government evolvement in the developing countries. Narrowing down the explanation from developed to general level in developing countries. In this section, the researcher attempts to outline and describe the current state affairs of some gulf countries and some Asian countries in terms of e-government implementation. According to the Department of Economic and Social Affairs Division for Public Administration and Development Management of the UN initiated. An annual report survey on e-government readiness index for the countries shows the web measure index, the telecommunication infrastructure and the human capital index along with their ranks

(UN, 2010). The report shows that the index of the Middle East and gulf countries are low compared to the European countries, which is depicted in table 3.

Table 3: E-government readiness for some countries and others (UN, 2010.p71)

Country	E-government Index Value	E-gov. development ranking
Republic of Korea	0.8785	1
United States	0.8510	2
Canada	0.8448	3
United Kingdom	0.8147	4
Netherlands	0.8097	5
Singapore	0.7476	11
Sweden	0.7474	12
Bahrain	0.7363	13
United Arab Emirates	0.5349	49
Kuwait	0.5290	50
Jordan	0.5278	51
Saudi Arabia	0.5142	58
Qatar	0.4928	62
Turkey	0.4780	69
Oman	0.4576	82
Islamic Republic of Iran	0.4234	102
Syrian Arab Republic	0.3103	133
Iraq	0.2996	136
Yemen	0.2154	164

1.7.1 South Korea e-government

South Korea, also called the Republic of Korea, is one of the East Asian countries. Korea is neighboured with three countries, Japan to the East, North Korea to the North which is the only land border to Korea, and the Republic of China to the West. The country covers a total area of 99,392 Km^2, and its inhabitants around 49,004,031 million (CIA, 2011). Seoul is the capital of the South Korea and it is the largest city, has a population of more than 10 million (Kim et al., 2009). Addressing and investigating of the South Korean experience might hence direct us towards some new facets in e-government development.

Korea's e-government journey walked through various processes and steps, initially started from 1987-1992 by computerizing various tasks, such as the creation of an

administrative database to include; residence, vehicle, real estate and other tasks. From 1993-2000 it started with information growth such as providing intensive information of patent, tax, procurement, customs, and creating a system for issuing passports and to prevent real-estate speculation, amongst others. From 2001- 2002 it created the e-government infrastructure, and from 2003-2007 around 31 e-government projects has been established (Yoon, 2005). The vision of Korea's e-government is to become "*World's best*", and "*open e-government*" to achieve this vision. Korea's government followed three objectives, such as "*Innovation of service delivery, enhanced efficiency & Transparency (in public administration), and realization of sovereignty for the people*". The fundamental aim is that all citizens and business will be able to enjoy 'seamless' public services through a single channel, using various access methods, such as the Internet, mobile phone, fax/telephone/mail, or personal visits to government agencies (Yoon, 2007).

The Korea government has established the e-government stage model to communicate with its stakeholders in order to provide information and services, which comprises of five levels. The first level is "*Initiation*" in which government provides limited information to its citizen. The second level is "*Development*" in this level government enriches the information to its citizen and updates the information periodically. The third level is "*Interoperation*" at this level citizen are able to communicate with government institutions through email, and electronic forms. The fourth level is "*E-commerce*" at this level citizens are able to utilise services online such as paying their fees and taxes. The fifth level is "*Integrated Administration*" at this level government provides services to its stakeholders based on a one-stop service approach, in other words the integration of government interdepartmental online services, and also converging the public and civil service (Yoon, 2007).

The growth of ICT infrastructure in Korea has been dramatically developed and the broadband penetration services are broadly evolved with its high degree of diffusion in Korea which influenced e-government and e-commerce (Lee et al., 2005). Korea has also attained the globe leading position in terms of ICT capability (Lee et al., 2008); Therefore, Korea's government and businesses are developing rapidly in terms of applications and next generation technology such as wireless broadband (WiBro) and Digital Multimedia Broadcasting (DMB) (Nam et al., 2008). Korea is one of the most developed countries in terms of broadband, according to the survey

carried out in 2007 broadband internet penetration exceeds 90% amongst Korean stakeholders, and around 90% of all exhibitions were using mobile phones (NIA 2008). One of the shortages in Korean government is a lack of social justice, according to Lee et al. (2008) ICT for development projects in Korea provide merely the elites of the recipient society. This implies those who have some income with those who are literate get the benefit. In addition, some ICT projects in Korea increase the inequity by broadening the divide between elites in the society who benefit from such projects such as IT skill training, and those who do not benefit such as the low income or poorer members of the society.

Despite of some shortages, Korea is one of the countries that have progressed practically in the context of e-government. Korea ranks as the first country in the world in regard to e-government development readiness and its index value is 0.8785 (UN, 2010). The e-government implementation in Korea includes four main dimensions namely; *..."on-line service government, paperless government, knowledge-based government, and clean government"* NIA (2008). It also devoted huge efforts to reducing the digital divide by establishing a project called '*Information Network Villages'* or INVILs. The goal of this project is to bridge the digital divide by offering PCs to the rural area within computer training for village inhabitants, and also makes sure village communities get the benefits of the IT infrastructure. Through this project citizens can sell their local products throughout the internet, and perhaps can advertise their particular goods or foods and encourage local tour programs through INVL website, (see www.invil.org). This project will assist the general public to access government information and services and thus increase affiliation to the state.

Furthermore, Korea's government has traced smart steps towards an anti-corruption and clean system. Kim et al. (2009) investigated how e-government systems in Seoul can reduce the corruption; this has been achieved by using the "O*nline Procedures Enhancement for civil application (OPEN)".* The system comprises of three characteristic dimensions of institutionalisation such as "*regulatory/coercive*, *cognitive/mimetic*, and *normative*" within the three anti-corruption strategies for the system. The findings revealed that the usability of the OPEN system for anti-corruption was effective in terms of both organisational aspects and robust leadership. This system has been known by other organisations such as the UN, the

World Bank and OECD (APDIP, 2006), not only by the Korean government and its citizens. This system essentially recommended by Mayor (Kun Koh elected in 1998) of Seoul, who wants to combat corruption in Seoul municipality government (SMG) and was started in 1999. The idea was to perform transparency in the civil administration by avoiding unnecessary delays in citizens' transactions and, also equality on the treating of civil affairs on the part of government employees. This approach played a significant role in developing Seoul towards e-Seoul to become a digital city. It is an online system that exposes administrative processes to the public in different service fields, for instance urban planning, housing and construction, sanitation, and others (Kim et al., 2009). With this system, citizens are able to follow its transaction procedures online, and able to check its civil affairs in real time at each step of the business process, similar to the international express mail services company such as DHL. Since the launch of this system in 1999-2007 more than 6.7 million people had visited the website, and further than 2.9 million documents were registered (Kim et al., 2009).

Furthermore, the survey carried out by United Nations (UN, 2010), shows online services availability which comprise of *emerging information services, enhanced information services, transactional services and connected services* of developed and developing countries websites. For instance in the Republic of Korea 97% of the information are emerging for public sector, 91% of information and services are available for citizens could be one-way or two-way communication. 66% of services are at the transactional stage, and 62% of services at the connected stage mean that e-participation in e-government system. From this case, the government authority can learn lessons from this type of approach to reduce corruption which is the main concern in developing countries.

1.7.2 Singapore e-government

Singapore is a republican country and is one of the Southeast Asian countries which consist of 63 islands. The area of Singapore is around 704 km^2 with the population of 5.183.5million according to the Singapore Department of Statistics (2011). The Singapore government has taken over several action plans to achieve citizen's confidence in terms of service provision and connect citizens to information

communication (*Infocomm*), which launched in the early 1980s. In the late 90s the Singapore government saw the connection of IT and telecommunication that changed the idea of service delivery and derived toward the e-Government Action plan I (2000-2003) and the e-Government Action plan II (2003-2006).

In addition, Singapore's government initiated a 10 year master plan from 2005 to 2015 called intelligent Nation (iN2015) to identify the promises of *infocomm* over the next era. This plan reassures the role of *infocomm* in performing the vision of iN2015, a global city supported by *Infocomm*, and also to innovate and internationalise the *Infocomm.* The sketch of the strategic master plan and the journey of Singapore government are shown in figure 4.

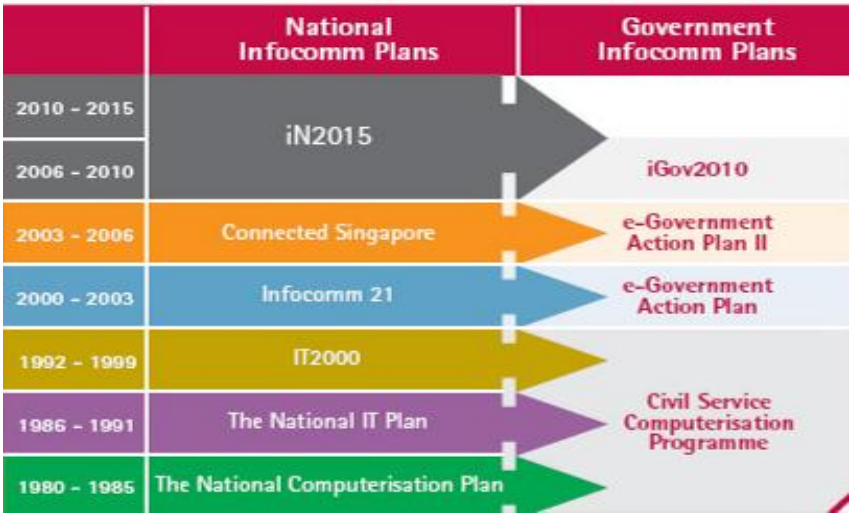

Figure 4: National and Government Infocomm Journey, Singapore Government (2010d)

The Singapore government also disclosed a new document with relevance to the strategy of the government from 2006 to 2010, and the vision towards an (iGOV2010) integrated Government (Singapore Government, 2010c). The vision is to integrate government through the automation of back offices, and focused on customer desires along with the quality of service delivery that concerns citizens and connects them via *Infocomm*. In order to perform the desired vision, four main strategic aspects have been identified and depicted as below.

1- Rising the number of services and its quality
2- Increasing citizen participation in e-services and e-engagement
3- Improving capacity and cooperation among government entities, and
4- Improving comparative at national level

Initially the application of ICT within the Singapore government goes back to the early 1980s when government utilised the civil service computerization programme (Calvin et al., 2008). The e-government in Singapore was launched in 1990s and was proposed as the gateway to all services of Singapore's government. Singapore is an attractive case to address and investigate, due to the devoid of conventional resources, and also it has been able to accomplish a superiority place in e-government implementation (Srivastava and Teo, 2009). The Singapore government is ranked 11th in e-government development around the world and first in South East Asian countries, and also second in Asia (UN, 2010). The aims of Action plans is to transform the Singapore government with the use of ICT to improve the efficiency of internal procedure and functions via automated work processes and paperwork reduction. Therefore, beginning applications concentrated in the area of the *"process of the transaction, data modelling, and database management"*.

The Singapore government rapidly started with the first e-government Action Plan in 2000 to succeed the civil service computerization programme. With the total budget assigned to the first e-government Action Plan was $1.5 billion. The goal of the first e-government Action Plan was the concentration on the employment of ICT to make possible the transactions between stakeholders. In order to go forward towards leading e-government, so it can provide services to the country in the digital economy. The Singapore government had two main objectives at the launch of its e-government program. The first objective was to sustain the degree of trust in government as a legacy. The second objective was to expand a high level of trust by the citizens in technologies enabling e-government (Srivastava and Teo, 2009). Consequently, by considering these two objectives (trust in government and trust in technology) gradually and steadily moved forward to a system with a high level of trust.

Srivastava and Teo (2009) remarked in his study that the Singapore government achieves these objectives by three ways. The first way is "*putting institutional trust building measures in place",* such as The National Trust Council (NTC) in 2001. In which is implemented the first national Trust Mark Programme. The second way is, *"taking feedback from citizens"* such as using ICT to receive feedback from citizens, participating in the policy checking and political issues. The third way is, "*having*

the top leadership commitment and support for e-Government" such as support from top leadership for e-government initiatives which are vital for seeking citizen's trust and hence, leads to a successful system. Consequently, enabled Singapore to develop in terms of economic development and, hence it can be seen that Singapore is currently ranked the first competitive economy in the world in "T*he World Competitiveness Scoreboard 2010*", published by the International Institute for Management Development (IMD) (see www.imd.org).

In the first action plan the government decides to build an integrated turnkey technology system to evolve and operate all the e-services provided by different government institutions in Singapore. This integrative turnkey technology system was called "*Public Service Infrastructure*" (PSi). Since then the PSi has become the primary infrastructure which enables citizens to access any required government, e-services any time anywhere, in respect to the availability of the internet.

Singapore's government authority followed a five stage e-Service Content Development Model, which is comprised of; *"publishing, interact, transact, integrate, 3P integrate".* The services provided by various government institutions in Singapore were experienced to be informative content. The first stage is the publishing information and the procedure and guidelines for different services provided by government institutions. In the interact stage some of the public services transactions are provided online, such as an application form for business license available online, and can be downloaded and then submitted through postal mail or physically going to the office (one-way interaction). The early stage of e-government implementation was the concentration on the publishing e-services on PSi, however the progression has been happening over the years. In 2003 most of the front-end services provided to its citizens based on citizens' requirement were online. Consequently, Singapore was also becoming known as an international leader in e-government. Despite of the success, Singapore launched action plan II (eGAP II) in 2003. In order to convey the public service into a networked government that provides accessible, integrated and value-adding e-services to citizens. The government's vision was the e-lifestyle would be widespread in Singapore by 2006. The concentration has been expanded from individual e-service to a single integrated e-service. This integration of e-services has been performed along with action plan II or *"eGAP* II". The government has also attempted to

guarantee that the services provided to its citizens are easily accessible. To gain this, they have used a central web portal as a main gateway for all various government e-services such as www.igov.gov.sg. On the transact stage the complete e-service can be satisfied online, without going to the offices physically. For instance, the applicant can fill in the business application online and submit it through the website and can even make the payment online. This will totally reduce the procedure of physically going to the agency to satisfy any part of the transaction.

The Singapore government concentrated the transaction stage during 2000 till 2003, since in 2003 Singapore expanded and concentrated on the integration of the services. At this stage the government established a horizontal approach between agencies for the citizens' benefit, not vertical approach merely for agencies benefit. Therefore, in this stage, the individual services have been integrated together in a citizen-centred based way. For instance the One-Stop Public Entertainment Licensing Centre (OSPEC), where all the license applications can be completed online in one online application.

For further improvement of the e-services, the government established a new stage called 3P integration (*"Public, Private and People Sectors Integration"*). In this stage the public sector provides essential services to its stakeholders. For instance, the integration of the business license application service with the appropriate e-service from a property trader. This will assist the applicant to identify the appropriate shop space. On the 3P Integration stage, e-services are not only integrated across the public services in the government, but the degree of integration advanced even further to cross into the people and private sectors as well. The involvement of the stages and the relationship between the e-services in Singapore revealed that this process has been progressed based on two axes, the citizen-centre based approach and the degree of integration. To analyse the implementation of e-government in Singapore, Calvin et al. (2008) mentioned to four components namely; *"information content, ICT infrastructure, e-government info-structure*, and *e-government promotion"*.

The core ICT infrastructure of Singapore's e-government is the PSi, which is designed to be a centre of integrated e-government in order to support evolvement, deployment, and process of the different e-services from various government institutions. However, the concern here, if for any reason this centre fails in its

operation, subsequently the entire e-services from various government institutions would be out of operation (Culvin et al., 2008). This situation is definitely not acceptable, whereas some of the services provided to the citizens are merely available online. Therefore, the ICT infrastructure should be of a high efficiency availability of the e-services. For alternative cases it is essential to establish other channels apart from the internet in order to overcome the drawbacks of the PSi should it fail. Another point that influences the e-government effectiveness in Singapore is the awareness of only considered citizens or public to use the e-services, no reference to employee's awareness and the potential mechanism to be employed (Carter and Bélanger, 2005).

Currently, Singapore government is establishing a master plan for an e-government system. The aim of the this plan is to assist and facilitate the major transformation of e-government, from *"Gov-to-You"* approach to a *"Gov-With-You"* approach to create a collaborative government that connects with the people. Hence, it enhances a social network technology to drive innovation and to promote co-creation (Singapore Government, 2010c). This plan focuses on three aspects; the first aspect is *"Co-creating for Higher Value",* in which the public sector cooperates with the private sector to create a higher value to provide better services and reach the customer's wishes. Externally, collaborating among countries such as Singapore and the Republic of Korea, in which a signed agreement on the project regards e-government cooperation. Internally, land transport authority with Google map to offer an integrated service for motorists and travellers for travel planning. This cooperation between public and private sectors and accessibility of government information required to guarantee the privacy and security of information. However, the master plan did not indicate to the security of this information exchange and might influence the national security of the state (Conklin, 2007).

The second aspect is "*Connecting for Active Participation"* the idea is that the collaborative government attempts to take an opportunity to join and connect with their citizens, also including them in forming a coherent policy of the public. Through social networking channels such as; Facebook, blog, and twitter, and so reach out to a huge part of the society efficiently. Many politicians have started to benefit from social networking media for national election campaigns. However, this technology might cause some uncertainties and risks. For instance the minority of

people can create what is common or against what is right for the state. These require more attention and should be taken into consideration to implement a successful system. We should also be aware of some part of the community who are not able or do not prefer to use new technology, and should be treated through awareness campaigns involving the media to ensure no individual from the community is left behind (Calvin et al., 2008).

The third aspect is *"Catalyzing WOG (Whole-of-Government) Transformation".* This aspect concentrates on public sector itself, by establishing the latest ICT infrastructure and has to be sunken in the same enabling technologies and culture. E-government in Singapore used cloud computing approach, and operates a private government cloud to offer widespread ICT infrastructure, application and, services. The government also concentrates on the business analytics to assist public sector institutions to improve the effectiveness and efficiency of services as delivered to the public. Despite the development of ICT infrastructure and organisational structure, there is no reference to the opportunity for human capacity building development which will directly influence the progress of e-government system (Coursey et al., 2007; Norris and Moon, 2005).

Singapore has managed to cooperate with foreign visitors and delegators to share through iGov Global Forum to offer information on how government can undertake e-government challenges and improve the services to their public (Singapore Government, 2010b). In addition, Srivastava and Teo (2009) see that the key success factors of the e - government system in Singapore based on two main points. The first point is the language, in which the major language in Singapore is the English language. This has assisted in the propagation and use of ICT components by government and citizens. This is in contrast to many other states where their main language is not English such as in Arabic countries. However, this cannot be applied to every country, for instance Korea is one of the developing countries ranked first around the world (UN, 2010) and the English language is not the major language. The second point is the leadership and management structure; Singapore government is stable and has a pragmatic and proactive government. Also with a robust management structure that guarantees a formula of effective and efficient consultation in decision making. This may not be the case in any of the other states such as Arabic and some Middle Eastern countries, where they have dictatorship

regimes and unstable countries. Such structure ensures a formula of efficient consultation in decision making, and a common purpose in the development of e-government among all Ministries and Statutory Boards. Despite of some limitation but, the Singapore government is progressing and moving forward to better service provision opportunities for its citizens. Therefore, governmental authorities can learn lessons from strengths that they accomplished, and take into consideration the opportunity for adopting this strategy in their potential solutions.

1.7.3 Bahrain e-government

Bahrain is one of the developing countries that gained various milestones of success in the implementation of the e-government program since May 2007 (eGovernment Authority, 2009). According to the research carried out by Sahraoui (2005), it stated that Bahrain's e-government came to the public prominently when it was used to run the municipal and parliamentarian elections in 2002. Sahraoui also shows how the gulf countries were never planned to transform the inner working of government, and shows that Bahrain's e-government is a success example in terms of the design of the reality gap theory (Heeks, 2006). They outlined the difficulties and challenges that face the gulf e-governments such as the absence of research and evaluation of current e-government initiatives.

The Bahrain e-government project consists of two main phases; infrastructure and application, each lasting two years along with being concentrated on five areas of architecture as such; *security, information, applications and management* (Mohammed, 2009). The main strategy of Bahrain's e-government is to concentrate on guaranteeing the effective and efficient delivery of services to their citizens, government, businesses, and visitors. Another aim is to enhance the citizen's life by making more than simply adopting technology and also through accurate, comprehensive, and timely information. Initially, the e-government provided 30 services, but in May 2009 increased the number of services and provided 90 services, and recently completed the national strategy program that started from 2007 to 2011 encompasses 203 e-services provision via multiple channels to their citizens (Singh, 2011). Additionally, the Ministry of cabinet affairs was stated that this program is one of the significant aims has been accomplished (Singh, 2011). The

electronic identify card (eID) has been also recently launched in Bahrain in order to enable citizens to access government services, thus being guaranteed protection against online theft (IANS, 2011). All these developments influenced e-government system in Bahrain to move forward to be the first on the Arab level and third in Asia and also the thirteenth on the global level as shown in table 3. E-government in Bahrain gained progress with a difference of 29 ranks. While, the United Arab Emirates gained the second on the Arab level and ranks 49 on the global level. From this comparison it can be observed the development level of the Bahrain's e-government project.

Bahrain is one of the developing countries and used e-voting in 2001, the first country in the region (Kostopoulos, 2004). The participants used their CPR (central population registration card), and they had the possibility to participate in a diversity of national issues. Furthermore, it is the only country in the GCC that improved and increased its website measure index, since introducing its smart card system for a diversity of possible interactions (Sahraui, 2005). Bahrain's e-government is a significant part of the national IT plan called strategic information system plan (SISP), which was launched in 1993. This was established to direct the evolution of an open-standards based national IT infrastructure (Sahraui, 2005). In 1996 this plan reached in the creation of government data network (GND) based on a normalized data infrastructure. However, this strategic plan has not convinced the citizens and is unable to enhance the social perspectives and citizen participation (Sahraui, 2005). Moreover, the main success of Bahrain's government is relatively due to the existence of a central authority (CIO) Central Informatics Organization. However, this organisation cannot be responsible for higher order goals such as government modernisation for transparency and accountability that stay inside the political area, because the CIO is mainly an IT entity (Sahraui, 2005). Successful e-government programs like the republic of Korea and U.S.A. ranked first and second are being evolved with the full participation of citizens respectively. In the case of Bahrainis has also developed in terms of citizen's participation and is ranked 11th in 2010 of 36 in 2008 (UN, 2010). Participation of citizens not only guarantees the use and satisfaction of e-government services, but creates a transparent and accountable environment. Thus, establishing a base of a civic and democratic society helps to redefine government (Tan et al., 2005). However, currently Bahrain suffers from the

lack of democracy in the political system due to conflict between the Sunni royal family and Shia protesters across the country which will directly influence failure of the e-government project. On the other hand, according to the UN ranking this is based on three sub-dices. It can be seen that GCC countries such as Bahrain at par with world leaders in e-government (UN, 2010) on both telecommunication infrastructure and human skills. The researcher believes that the development of Bahrain's e-government is technology based rather than a citizen centric based approach.

Despite the development of e-services in Bahrain's e-government, many challenges are still to be overcome and need to be considered in order to reach citizens' expectations. The first shortage is the lack of an awareness campaign that will strongly influence the use of e-services, along with the lowering of web readiness. This is due to the lack of quality of services provided via the web. The second shortage is related to the smart card system which is only in the Arabic language; the non Arabic language speaker, i.e. an English language speaker cannot make an appointment. For example, the CEOs blog page is in English on the main portal, but when clicked on, the displayed page occurs in Arabic. This is due to a lack of IT, along with a lack of consultative staff in government division. The third shortage is the lack of services provided by e-government such as online service inquiry regarding housing allowance that is crucial for citizens. Services have to be offered to one hundred percent of citizens for e-government initiatives to be successful. Though, widespread access is still a vision in Bahrain e-government, and hence the portal has not reached the integrated stage. The fourth shortage is the lack of display format of the portal's interface in terms of colour and font size particularly in the Arabic language. According to the citizens' perspective in the "Blog" part of Bahrain's' portal, there is a lack of integration of service provision to the citizens and are not as efficient as required. The fifth shortage is the lack of enough services available on-line in terms of education. However, there is an opportunity to offer educational records for the entire students in the country, and increase awareness of e-government initiatives amongst the youth within the efforts of a recent strategic plan in order to achieve its future vision in 2030 to be fair and open (see www.ega.gov.bn or www.bahrain.bn).

1.7.4 Dubai e-government

The United Arab Emirate is one of the GCC states comprising of seven Emirates. Dubai is one of these Emirates as a federal government with the largest population amongst them and has the most evolved economies in the region in general and in the emirates in particular. It is also categorised as a high income evolving economy according to the International Monetary Fund (IMF) (Zhao, 2010). The primary vision of Dubai e-government is to lead an economic hub, also provide a high quality of services to citizens, business, and government institutions. Dubai leads the region in diverse aspects such as ICT infrastructure, telecommunication and, economic development. In 2010 Dubai ranked 9th in e-government development among Asian countries with an index of 0.5349 and third in the Middle East after Bahrain and Israel respectively (UN, 2010).

Dubai was the first initiative e-government system in the UAE and was launched in 2001 via its portal (www. dubai.ae), and the goal is to facilitate the lives of citizens and interrelation of businesses with the government, also to develop Dubai as a high economic centre (Weil et al. 2006). Dubai Portal is a very promising e-government experience in the United Arab Emirates and in the whole Arab World (Al-Omari, 2006), fostering e-services adoption via customer management through www.dubai.ae. Through this portal Dubai government offers information and services to its stakeholders electronically. For example more than 1600 services are provided online by Dubai government. It is not certain how many of those will reach a significant level of usages; however most of the services still have not reached the transactional stage (Sahraoui, 2005).

Some services are online, such as traffic fine payment, company registration; visa application, health care renewal and, will also be starting with another 55 services for civil defence clients online. The Ministry of labour declared that it is looking for significant development in the services provided to its citizens through establishing the electronic signature card (e4all, 2011). The Ministry of Labour created the E-communication or "*E-Natawasal*" projects on its website. The website launched in 2008 and assists consumers to communicate online with the Ministry. According to the official magazine of Dubai e-government, around one million customers utilised

this service with around 9377 companies and employees (e4all, 2011). With this service the company can obtain information on its establishments, also facilitate employees to obtain information on labour cards and contacts. In addition, the Ministry of Interior broadcasts the achievement of the electronic passport for UAE people. This project uses new electronic techniques which engender very obvious data and significant information. The passport will include an electronic chip as storage of data that facilitate travellers at country borders. The other benefit of the chip is facilitating in speeding up the checking at borders for countries which are equipped with the technology to read the electronic chip. The passport holder can use their passport for other electronic services in the future due its electronic chip.

The e-government in the Emirate is measured as the top model of the gulf countries. However, the government authority stopped all the alternative channels of delivery of services in order to engage citizens in participating in e-government services through the internet. The researcher believes that this will restrict the elder people utilising government services because the older people suffer from the lack of IT skills and they would not be able to use electronic services (Bernhard, 2010). Therefore, this will be a key drawback in e-government implementation in the Emirate. In addition, Al-Azazi (2008) mentioned in his thesis regarding the factors that influence e-government security. He indicated both an internal and external threat that the government in Dubai faces in terms of security. For instance, the leakage of information relevant to the security and privacy of people via e-transfer, oral information transfer, and physical leakage via the medium, along with the lack of IT security and regulation regarding freedom of information act (Zhao, 2010) and hence it will impact the trust in government.

In addition, in his research he revealed that 84% of respondents indicated that the major threat from internal institutions is the accessibility of government employees to unauthorized information resources. The other major security limitation is 58% of respondents indicated to the lack of robust security and operational proficiency due to launches of new e-services or new technologies sustaining these new services. The same research remarked on the fact that decentralised e-government strategy has influenced the lack of an integrated security program amongst Dubai's 26 government departments. In this regard, merely 37% of respondents verified that they have integrated e-services that will lead to the lack of integrated security

programs for the integrated e-services. Therefore, the UAE has backed off to rank 49th in 2010 (NU, 2010), but was 32nd in 2008 (UN, 2008) this is due to all the above hurdles that have been outlined. Therefore, a strong policy of security is essential within a robust encryption means to defend the confidentiality of citizens' information (Conklin, 2007; Ebrahim and Irani, 2005).

E-government sectors required to integrate and standardise their internal operation to standardise back-office operation and functions. The e-government institutions required to cooperate together to reduce the procedures of citizens' transaction (Ferro and Sorrentino, 2010). The unavailability of e-integration among government institutions will impact on the delay of accomplishing citizens' transactions which require moving from one institution to another and approval from various institutions. To achieve this approach Dubai government recently presumed an "*e-Transformation*" that consists of integration and standardisation of government institutions on information bases (Randitha, 2010). In other words, all government institutions can share resources such as operating system, information, infrastructure, proficiency, and workforces in order to facilitate improvements to its operational and technical procedures. The first forum for e-Government Resource Planning (GRP) has been organised. The goal was to find an integrated plan to improve the e-transformation and integrate the 29 Dubai government institutions and ...'*we want the UAE to be among the leading countries by 2021"*. The strategy was to enhance all related services to citizens and work with leadership's perspective to attain an outstanding in creating a "*knowledge-based society and economy*" Randitha (2010).

Zhao (2010) found that each of Dubai's government institutions has its own website management system which is commonly not connected and cooperated within each other. There is another shortage found in Dubai e-government which is; the lack of interoperability (e-integrity). Internet penetration in the UAE is 75.9% (Internet World Stats, 2010) and ranked 5th in terms of service transaction and ranked 12th in terms of web measurement (UN, 2008). However, the service provision did not meet the citizens' desires, and its lack of usability of online services. This is because of the lack of awareness and promoting citizen to use e-services (Zhao, 2010).

Another limitation in Dubai's e-government in regards to the portal is the availability of information and services in the English language rather than the Arabic language. According to a study carried out by Zhao (2010) all the services on the Dubai portal

are in an English version however, 1/6 of them have an Arabic version and 1/3 of government agencies did not choose an Arabic language as a default language of its institutions. Notwithstanding, these institutions do not provide business sectors and offer their services mainly to UAE citizens. In addition, a number of government websites presented pages in an incompatible way in terms of language. For instance, the main page may be in Arabic, but when searching for more information and services, the language will change to English, and when clicking on another page it may change to Arabic. Zhao (2010) concludes that the English users of services are more satisfied than Dubai citizens due to a lack of services in the Arabic language. This is due to these websites which are lacking common standards that facilitate to ease navigating in the desired language. This is because of the lack of IT skills and consultative bodies in the government sector and, many institutions employ foreign companies to design its websites and that will be for a limited time. Therefore, it can observe that the English language is dominant on Dubai website. The lack of a professional language editor in the e - government sector will influence the usability of information and e-services among citizens.

Researches revealed that the low index in the Middle East and Gulf countries (UN, 2008) comes from the government services which cannot be transformed for e-delivery because of the embedded bureaucratic culture, the lack of the internet infrastructure, lack of management (Heeks, 2006), and the lack of citizens' awareness of the new system which has an effective impact of e-government development, and providing literacy requirements for the use of e-government. To overcome the low index the government authority could take into consideration the customer centric concept in order to increase the e-services awareness. Determine the customer's need and adapt governance processes to better satisfy those needs. Different channels and mechanisms could take place for this purpose including training e-government users, an e-citizen loyalty, and special magazines.

1.7.5 Jordan e-government

Jordan is one of the Middle Eastern countries that neighbour with Iraq. According to Ciborra and Navarra (2005) Jordan is one of the Middle Eastern countries that have a rich history of ICT initiatives and good governance. E-government projects were

recognized as a national program in 2000 by his Majesty King Abdullah the second (Abu-Samaha and Abdel Samad, 2007). Jordan has established a three year strategy which focuses on three main facets; legislative framework, infrastructure framework, and service framework. The strategy was aimed at connecting all government institutions by 2009, along with expanding broadband coverage to all over the country. Further significant focus has been initiated to connect many schools to the network (Elsheikh et al., 2008; Sallard and Al-yousuf, 2007). Jordan's authority also introduced a new strategy called "*The Jordan Digital Strategy goal"* The main goal of the strategy is to improve the quality of services and provided to stakeholders effectively and efficiently. The strategy also recommended utilising ICT to drive the way government engages with citizen and business (MOICT 2006). Accordingly, the internet penetration increased; due to the availability of developed ADSL and increase of mobile phones in households is around 86% in 2007 and 94% in 2008 (Al Hujran and Shahateet, 2010).

The United Nations report survey (UN, 2010) shows the rank of Jordan as 51st based on the maturity level measurement. Also Jordan is one of the Middle East countries which ranked as third among the Arab countries (UN, 2008). Additionally, the usability of Jordan's website in terms of service provision as 74% of information and services are emerging on the website for the public sector, 38% of services are available for one-way or two-way interaction, 34% of services at the transaction stage, 34% of services are at the connected stage implies a one-stop shop of services (UN, 2010). However, e-government in Jordan has moved backward in terms of e-government development from being ranked 50th in 2008 to 51st in 2010 in the participation index in the world (UN, 2010). This is because the e-government services still have not properly reached the transaction stage because of some challenges affecting adoption of e-government implementation. For instance, lack of interoperability among entities, limited funds for e-government development, resistance to change and, lack of e-literacy (Taqali, 2009). The Jordan government website has some weaknesses, for instance; some of the links on the website are not active such as e-government discussion forum. That should be considered due to it enabling citizens to participate in decision making. Consequently, the Jordan authority should take real steps to overcome these challenges in order to sustain services.

Researches revealed that the low index in the Middle East and Gulf countries (UN, 2008; Al-Hujran and Al-dalahmeh, 2011) comes from the government services which cannot be transformed for e-delivery because of the embedded bureaucratic culture, lack of internet infrastructure, lack of management (Heeks, 2006), lack of citizen's awareness (Shareef et al., 2011a) for new systems, lack of citizen knowledge, and shortage of providing literacy requirement for the use of e-government. To overcome the low index, the government authority could take into consideration the customer centric concept in order to increase the e-services awareness in order to sustain e-services. Determine the customer's need and adapt governance processes to better satisfy those needs. Different channels and mechanisms have to be considered for this purpose including training e-government users, e-citizen loyalty, and special magazines which have a positive impact on e-government development. Table 4 shows the overall strengths and weakness of the e-government systems in some Asian countries.

Table 4: the overall strengths and weaknesses of some e-governments in Asian countries

Country	Strength	Weakness
South Korea	-ICT infrastructure (WiBro & DMB) - Online Procedures Enhancement (OPEN), and Information Network Villages (INVIL)	Some lack of social justice
Singapore	-Strategic action plan, iGOV2010, iN2015, and infocomm -Citizen-centre based approach and the degree of integration. -Robust management structure	-Merely depending on the Public Service Infrastructure (PSi) centre. -The awareness campaign only for citizen not considering employees.
Bahrain	-Strategic information system plan (SISP)	-More is technology base e-government (infrastructure and application). -Low of web readiness and difficulties with accessibility. - Lack of common standard for navigating on the web in terms of language -Lack of public awareness -Lack of social justice
Dubai	- Customer centric concept -Leads the region in terms of ICT infrastructure, telecommunication and, economic development. -E-Natawasal project help regulars to communicate online with the Ministry of Labour.	-Stopping all traditional channels in order to urge citizen to use e-services. -un-automated back-office process -Lack of interoperability. -Lack of cooperation among institutions -Lack of robust security and regulation regarding freedom of information act -Some lack of political freedom - Availability of the information and services mostly in English language rather than in Arabic language
Jordan	-Three year strategy -focuses on three main aspects; legislative framework, infrastructure framework, and service framework. - The Jordan Digital Strategy	- Lack of interoperability among entities. -Limited funding for e-government implementation -Resistance to Change -Lack of e-Literacy -Some lack of political freedom - Technology based approach

Chapter Two: ICT and E-government in Kurdistan Region of Iraq

Information and Communications Technology is rapidly changing and plays a significant role in developing the societies and KRI cannot be excluded from these developments. ICT is used as a tool of e-government to decrease the load of public administration and the business performance to the community. Consequently, that plays a key factor in decreasing the gap between government and stakeholders in various facets such as public service provision.

This chapter introduces the current state affairs of the KRI; includes the level of ICT infrastructure, internet and mobile penetrations, type of channels for service provision, along with the transaction situation in the government agencies. The researcher also analyses the drawback and advantages of the current services that are provided to the public. There are various factors influencing the implementation of e-government services, such as; social, technology, economy, and politics. These factors will be discussed in detail in this chapter.

2.1 Kurdistan Region of Iraq (KRI) at a Glance

Kurdistan is a federal region of Iraq. It is a secular and democratic region with a parliamentary system of government. It comprises of three cities, namely; Erbil (capital), Suleymani, and Duhok. According to the Iraqi constitution which was approved by a national referendum held on 15 October 2005. KRI is located at the north of Iraq; it neighboured Iran to the east, Syria to the west, and Turkey to the north. The area of the region is about 40,643 Km^2 (see www. Krg.org) and the estimated population are approximately 4,910,742 (KRSO, 2007). A geographical map of Kurdistan is illustrated in figure 5. After the uprising of spring 1991, the Iraqi central government withdrew all the administrations of Kurdistan. This has created a power vacuum situation, but the Kurdish authority was able to build an

administration by their efforts. They held an election in 1992, and made an accountability government.

Figure 5: the geographical map of Kurdistan

KRG was formally established in 2003 and recognized by the Iraqi constitution, it has its own president, parliament, and government cabinet which consists of 19 ministries, and a prime minister with a deputy prime minister**.** KRG comprises of various political parties that reflect the variety of the region's citizens, including Kurds, Turkmen, Chaldeans, Assyrians, Syriac, Yazidis, Ermines and others (www.krg.org). Kurdistan was lagging behind in ICT prior to 1991. In terms of telecommunication infrastructure development, the growth of the fixed telephone network throughout Iraq, especially Kurdistan was below expectation. There was no mobile communication, no computers in the institutions and schools, also there was no satellite channel. In post 1992, the KRG started to develop the country, starting with the administration and computerizing the governmental institutions by offering computers to the universities and schools in order to develop the educational process to follow the world's development.

In recent years, Kurdistan turned to ICT as a tool to improve government services and citizen requirements. In this regard, a government cabinet has launched an IT department at the council of ministries, to implement IT projects in collaboration with various stakeholders and sectors. KRG's website was well known by the public in the late 2002, and is organized by the department of foreign relations in the KRG. The website was situated as the government Info-structure and designed as the information gateway for all the external and internal public in order to obtain information of government's activities and news.

2.2 E-readiness in Iraq

According to the UN e-government report (2010), Iraq lags behind in e-government and the survey put the e-readiness rank as 136th, shown in table 3. Furthermore, the ministry of planning and development cooperation (MOPDC) of Iraq carried out a household socio-economic survey in 2007. It was carried out within the framework of a Bank project financed by the Iraq Trust Fund (ITF). This shows that in Kurdistan, the technological background particularly, internet and an overall there is a necessity for e-government to be satisfactory in comparison to the rest of Iraq (IHSES, 2007), which is illustrated in table 5.

Table 5: Use of internet users in Iraq in % (IHSES, 2007)

	Kurdistan Region	**Baghdad**	**Other governorate**
% of Internet users overall	4.3	2.1	2.6
At home	49.5	33.4	37.5
Internet cafe	22.1	27.8	40.6
School/University	10.0	12.9	9.8
At work	16.8	24.1	9.4
Others	1.6	1.8	2.7
Total	100.0	100.0	100.0
Average hour/week	7.6	10.5	8.8

In the contrast, currently Iraq is initiating e-government systems in certain institutions and it's in an early stage (see www.most.gov.iq). For instance, the council of ministries in which the prime minister's office is connected with formal speakers of the prime minister's office with the deputy prime minister's offices. In

addition, most of the government ministries and institutions have launched its website in order to publish important information, activities and, news, such as; government cabinet website (www.cabinet.iq) and others.

2.3 ICT Infrastructure in Kurdistan Region of Iraq

Kurdistan Region of Iraq in general, lagged behind in ICT prior to 1991 as explained in section 2.1, in terms of telecommunication infrastructures and the expansion of the wired telephone networks throughout Iraq. In particular, the Kurdistan communication system was very far behind, with telephone landline in big cities such as Erbil (capital), totalling only 10,000 interior lines and the connection between Erbil and other cities were non functional after the withdrawal of Iraqi government institutions from Kurdistan (MOC, 2009). There was no mobile communication network, and no computers were available at the government institutions. However, after the citizens uprising in 1991developing communication system became very difficult, because of the UN embargo and blockade from the Iraqi regime. Today during new cabinets of Kurdistan Region, the latest type of communication exchange has been launched. The Ministry of transportation and communication has built different types of transit exchanges 1000E1 and 600E for Erbil and Duhok respectively, and has also connected Kurdistan cities through a microwave network in type SDHSTM-1 (MOC, 2009). The regional government has always been focused on the role of the government in the re-construction of the Kurdish society, infrastructure, services, increased political freedom and tangible improvements in the people's daily lives. Since then, wireless technology, particularly mobile telephones have penetrated the Kurdistan market more rapidly than any other technology or product has. Mobile phones have become an inseparable part of the daily life.

According to the interviews carried out with the director general of the ministry of transportation and communication, it was revealed that there are many telecommunication companies existing in KRI. Mobile telecommunications in the region have been mainly dominated by Korek telecom and Asia-cell. The Asia cell is one of the oldest GSM (Global System for Mobile Communication) operators in Iraq. It was established in 1999 under the security of "no-fly- zone" time, in the city

of Suleymani it covers most of the Iraqi cities, and has more than 8 million users (see www.asiacell.com). Korek telecom launched in 2000 was the first provider in the city of Erbil and, Duhok was licensed by KRG of Iraq. The company has 2.5 million subscribers. Sana Tel is also another operator in Suleymani city. However, it has approximately 4500 subscribers and is much smaller than its regional adversary. Mobi-Tel is the first mobile 3G and 3.5G service provider in Iraq, and was licensed by KRG of Iraq to service in Iraq. Mobi-Tel launched in 2007, currently covers the area of Erbil and Duhok and, planning to cover Suleymani city, also has around 3000-4500 users. Summary of the telecommunication and mobile companies are illustrated in the table 6 and 7.

Table 6: Wired and wireless telecommunication companies in Kurdistan region

Company	Location	Spectrum/Frequency	Technique	Services
Newroz Telecom -Aria phone -Reber -Aria Net	Erbil, Duhok	450MHz 800 MHz 1900MHz	CDMA, ADSL, WLL WLL, EDVO	Voice Call, Internet
Nawand Telecom	Erbil	20MHz 4MHz	Wimax	Voice Call, Internet
Tarin Net	Erbil Erbil & Duhok	20 MHz 20MHz 2.4 GHz	Wimax Wimax Wi-Fi	Voice Call, Internet
7 Net Layer	Erbil	40 MHz	Wimax	Internet
Ray Telecom	Erbil	20 MHz	Wimax	Internet
Via Telecom	Erbil	20 MHz	Wimax	Internet
Linl-Tech	Erbil	20 MHz 2.4 GHz	Wimax Wi-Fi	Internet
Verenos	Erbil	20 MHz	Wimax	Internet
4-Time	Erbil	2.4 GHz	Wi-Fi	Internet
Brosk Net	Suleymani	20 MHz	Wimax	Voice Call, Internet
Cell Net	Suleymani	36 MHz	Wimax	Voice Call, Internet
Tishik Net	Suleymani	26 MHz	Wimax	Internet
Goran Net	Suleymani	20 MHz	Broad band internet	Voice Call, Internet
Pasha Net	Suleymani	10 MHz	MC Will	Internet
Fanos	Suleymani	450 MHz 1900 MHz	WLL WLL	Voice Call, Internet
Spider Net	Suleymani	2.4 GHz	Wi-Fi	Internet
Zana Mohamed mahdi	Suleymani	2.4 GHz	Wi-Fi	Internet
Zanyar	Suleymani	2.4 GHz	Wi-Fi	Internet
At Net	Halabja		Wi-Fi	Internet
Dost Net	Suleymani	2.4 GHz 5.8 GHz	Wi-Fi	Voice Call, Internet
Zozik Net	Duhok	2 MHz	Wimax	Internet

Table 7: Mobile Communication Companies in Kurdistan region

Company	Location	Technique	Services	Users
Korek Tel.	Erbil &Duhok	GSM, GPRS	Voice Call, Internet	2.5 million
Acia Cell & Hewler Phone	Sulaymani & Erbil	GSM, GPRS	Voice Call, Internet	8 million
Mobi Tel.	Erbil &Duhok	3G, & 3.5G	Voice Call, Internet	3000-4500
Sana Tel.	Sulaymani	GSM	Voice Call, Internet	300-400

Initial exploratory research shows that most of the communications company is wireless, which means the infrastructure of the land lines are still very weak. The

country is faced with severe electricity issues, which is interrupting its revolution despite the availability of huge natural resources in the country. Although the huge opportunity of the internet across the country, but still the quality of the internet is not sufficient to fulfil citizen's needs and desires.

According to the interview carried out with the head of the IT department at the council of ministries most of the ministries in the region are connected together via fibre optic cables, and also there is a consideration of connecting to the FLAG network. Recently, the Ministry of transportation and communication prepared to launch an e-government project by connecting government institutions via a network in the region this will enable citizens to communicate with the government under a network called *"Access Network".* This network includes more than 70 governmental institutions such as the presidency of council of ministries, parliament, ministries, banks and, universities via *"x-ray"* cable. In order to facilitate governmental and business transactions, and hence initiates the first stage of e-government (see www.moc-krg.com). This project will be discussed in more detail in chapter 5.

2.4 The current state affairs of the KRG

In Kurdistan, the e-government program is a national initiative, sponsored by the former Prime Minister of the region. It aims to improve effectiveness and efficiency in government services by improving the quality of service delivery to its citizens and other stakeholders. KRG turned to ICT in the recent years as a tool to transform government and to provide services to its citizen effectively and efficiently. In this context, the council of ministries has launched an IT department to establish a strategic road map for government, in order to support government transformation and to prepare for e-government initiatives and their implementation to follow the developed countries. The work of the IT department has started with a smart ID card database system project as an initial pace towards modernize government. The institutional structure of this project includes the central office which is allocated at the council of ministries and performs its process and ID card issuance through six sub-offices across Kurdistan region such as Erbil, Suleimani, Duhok, Kalar, Soran, and Akre. These offices are issuing smart ID card with facilities of standard,

professional and biometric for the entire KRG employees. It includes information about its holder and it will be a substitute for the ration card in the future**.**

This system have been integrated and developed with the collaboration of Emirates computers, Hyperlink, Fargo and Gulf Net Security systems. The financial budget of this project has been accommodated by the KRG with US$4.7m. The system encompasses 282 staff which comprises of managers, technicians, coordinators, registers and other related employees. The technical infrastructure of the system includes 220 PC sets, 12 servers, 40 special ID card printers with chips, and a scanner for scanning employee's formal documents. A digital camera used to snap employee's photos in real time along with e-fingerprint, and e-signature devices. The system has modified applications in order to design and manage the ID card issuance process, and also includes data entry, ID card issuance, report preparation, and statistics. This card encompasses various technologies that facilitate users to be identified, human resources management and evolvement in terms of institutional, social, and financial at KRG agencies level. It is used to identify individuals in both print and electronic formats. The ID card includes a serial number within bar code format and other seen and unseen features such as hologram, e-chip to keep it from counterfeit. This card also can be utilised for business, taxpaying, voting, and other purposes in the future.

However, the processes of issuing the ID card have various limitations that affect the delay of the process. For instance, the lack of digital process, in which employees have to visit offices to get application forms or the ministry or government institution, should get application forms for its employees. This implies there is no application form on the web in order to assist an employee to download it. In addition, there is no particular service channel to facilitate in allocating date and time to inform employees to return their application form. The ID card office informs relevant ministry or government entity to send their employees to submit their application forms and their temporary ID card. Hence, that will influence the delay of the process and affects efforts and time.

The other significant project has been established by IT department is the IT Academy (ITA). The ITA was launched in 2009 as a part of the strategy as a centre for learning and training government employees in various aspects such as; IT skills, managing, and others. This centre has been honoured official partnership with

Microsoft. Currently, the IT academy conducts training for government employees in terms of Microsoft Office as a first step. This academy is not used only by KRG institutions, but also used by other civic society institutions and NGO such as UN-Habitat, UNFPA, UNESCO, UNIDO, and NDI.

Furthermore, in 2008 the KRG signed an agreement with Price Waterhouse Coopers (PwC) to create an IT strategy for KRG in order to assist government to make a strategic plan of IT and a roadmap for implementation of the project with a budget of 3.5m US dollars. The initial IT department's aspirations focus on three main aspects (PWC, 2009):

1- To recognize other well known organizations and governments who have achieved and also identify strengths and weaknesses in order to learn from their weaknesses.
2- To recognize and understand the business requirements also the strategic aims of entities within the KRG and their perception on how ICT can support the delivery of their views, and
3- To evolve and agree on an IT strategy roadmap for the KRG to demonstrate the practical stages desired to implement this strategy and shed light on the chances for technology enabled inter-entity connectivity.

In essence, the IT department has initiated a strategy road map project with PWC and summarized in figure 6.

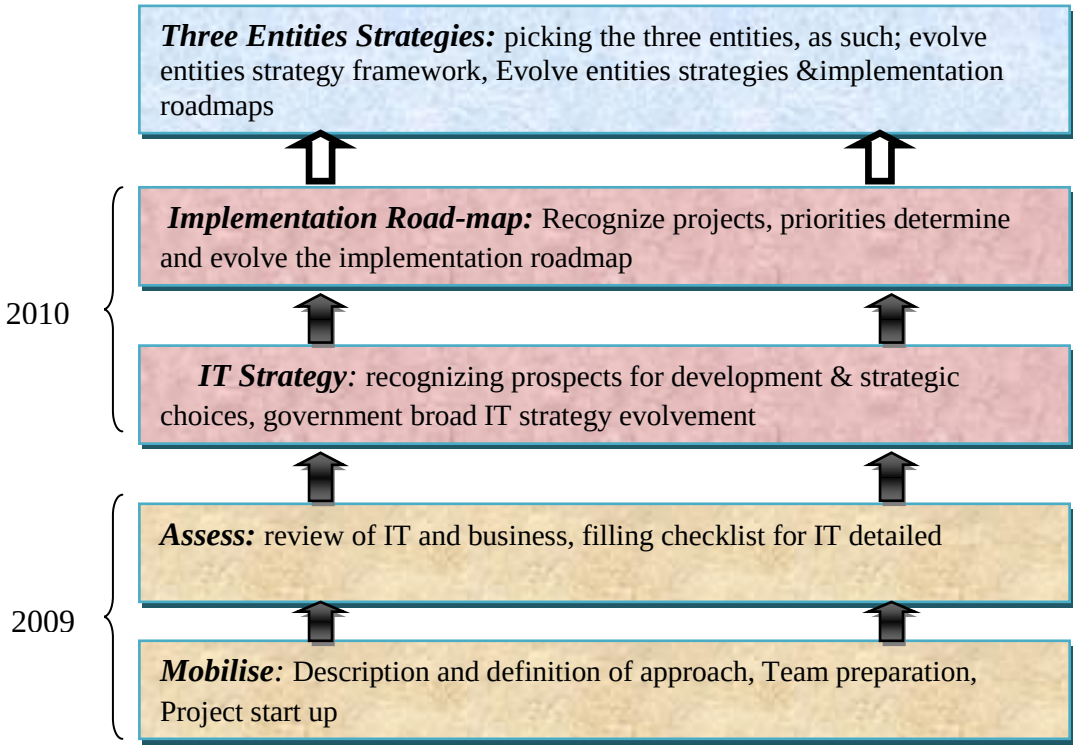

Figure 6: KRG's IT strategy and roadmap project (PWC 2009)

PWC and IT publication in 2009 stated that the first and second phases have been finished and shows an understanding of the present business and IT potential of maturity in which recognizes the KRG's strengths and weaknesses for each agency. The significant findings of the first two phases are as follow:

1- No long term KRG business for IT in cooperation with traditional business procedure and lack of knowledge of employees for IT possibility.
2- Shortages in communication channels infrastructure that facilitate enhanced information exchange, and cooperation amongst agencies and their employees.
3- It could broaden the gap between IT institutions and initiatives also shortages of a clear vision and qualified resources, and
4- Lack of written or implemented information security policies, procedures and physical determination.

Furthermore, the third phase is the IT strategy, has been assessed and recognized KRG business needs and issues in eight main areas PWC (2010a) such as;

- *Business Strategic Direction (Objectives) Maturity*
- *Business Process Maturity*

- *Service Classification and Level of Automation*
- *IT Maturity - Organization Structure*
- *IT Maturity - Information Security*
- *IT Maturity – Operations*
- *IT Maturity – Infrastructure*
- *IT Maturity - Business Applications*

The IT department analyzed and investigated information that gathered from various government agencies through meeting and documented. This process carried out by visiting 40 plus government institutions for capturing information. Plotting over 100 business processes and gathering information through 600 minutes of meeting. All this information was reported and translated into the Kurdish language. The overall outcome of this phase was presented to the audience in a two hour conference on 20th April 2010 at the council of ministries.

The key issue findings of the assessment of this phase are outlined below:

1- Shortage of united IT sight, strategic orientation, governance model and standards for KRG institutions.
2- Enhancement of the KRG institutions to reflect government functions including obvious objectives, roles, responsibilities and work descriptions.
3- Efforts towards cross-governmental business to enable Service-Oriented Delivery Model not institution based.
4- Lack of business process digitization and documentation.
5- Lack of human capability, and training,
6- Lack of internal evolved business application with a shortage in development standards, and support from third party.
7- Shortages in compliance with system software licensing agreements and needs.
8- Lack of technical infrastructure which facilitates effective and efficient information sharing amongst government institutions.
9- Richness of paperwork across government institutions influencing efficient information sending and receiving.
10- Lack of electronic laws and regulation to control data use and share.
11- Lack of information security assesses to guarantee confidentiality, availability and integrity.

12- Lack of a unified control point for lands geo-referencing, and
13- Unavailability of proper business application and systems to sustain local recruitments, e.g. language.

However, based on the PWC and IT publication in 2010, there shows the IT strategy moved forward to the fourth stage which is implementation roadmap that include

- *Set implementation priorities and Identify dependencies.*
- *Implementation Roadmap Development*

The efforts are continuing on the rest of the other phases to investigate and develop the KRG IT implementation roadmap along with budgets will be accomplished from 2011-2016 (PWC, 2010b).

2.4.1 Gender Characteristics

The data collected from questionnaires and the demographic profile of the respondents demonstrates that 69% (186) of the ordinary citizen respondents are male and 31% (84) were female. Whereas 73% (70) of the employees' respondents are male and 27% (26) are female. In addition, 32% of the ordinary citizen's respondents are young at the age of 26-30 which is depicted in figure 7. Consequently, this shows that the younger people are performing the transaction with government and, hence eases the implementation of e-government in the region. Furthermore, 45% of the participants going to the government departments are employees, and have to leave their jobs for some time in order to execute their transactions.

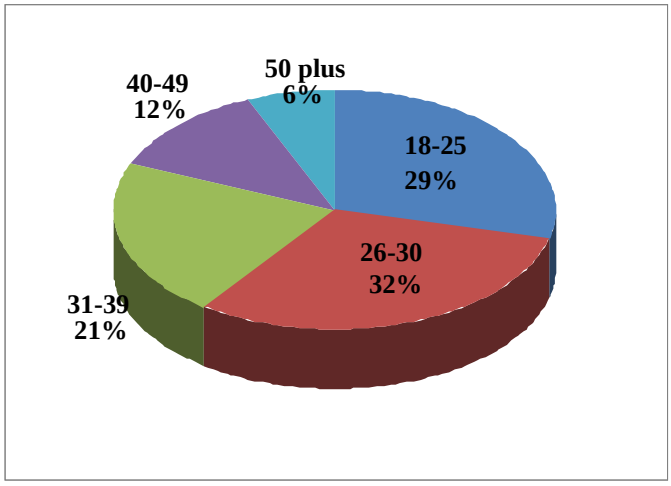

Figure 7: Participant ages

2.4.2 Computerization and Internet

After the formal establishment of KRG, the Kurdish authority has started to equip all government offices, universities, and most of the schools with computers. In this regard, based on the interview accomplished with the director of the ministry of communication, all the ministries are connected via fibre optic cables, and also there is a consideration of connecting to the FLAG network. This network connects the U.S.A., Japan, and the Middle East through an undersea cable system via Turkey. Currently, KRG is also in a discussion with Iran to connect the Kurdistan region with Iran via fibre optic cable.

In terms of the availability of computers at home and using the internet, based on the survey carried out in Erbil (Shareef et al., 2010b) 92% (98) of the government participants have a computer at home which is depicted in figure 8, and 84% (80) of them use the internet, with 60% of the participants accessing the internet at home.

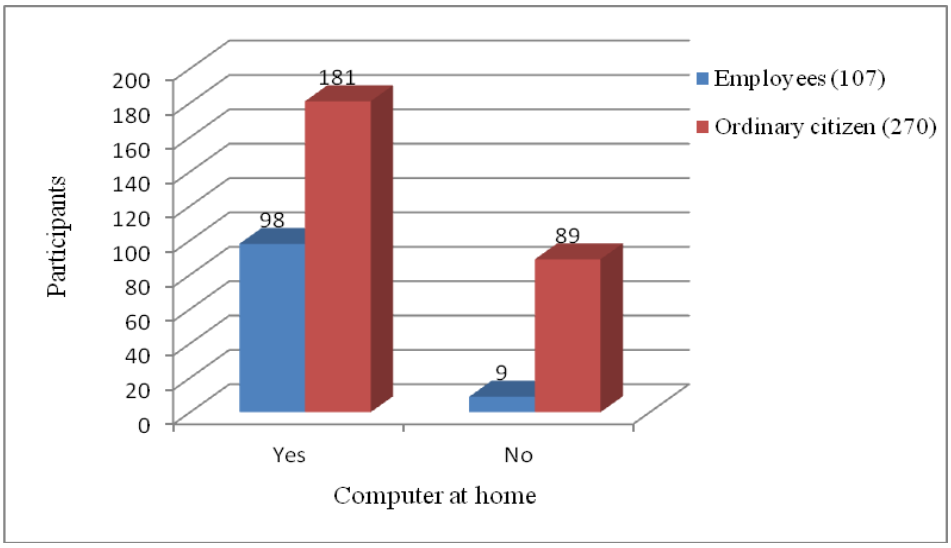

Figure 8: Availability of computer among citizens and employees

Moreover, 72% (62) of them spend more than one hour online per a day. The results of the survey show that 67% (181) of the ordinary participant citizens have a computer at home, whereas 54% (93) of them have internet access at home, and 27% (46) of them use it at work. Furthermore, 51% (89) of the respondents access the internet for more than one hour per a day, and 33% (51) of the respondents accessing the internet for 45-60 minutes, while 16% (32) of them access it for 0-44 minutes (Shareef et al., 2010b) as depicted in figure 9. These results point out that, citizens in Kurdistan have experience in using computers and internet. This implies that citizens in the region have the skills and they might be able to use electronic system. Despite many of the citizens of Iraqi Kurdistan using the internet, the quality of the internet is not as good as to perform transactions accurately and promptly. Therefore, it is important to seek more government effort to enhance the quality of internet.

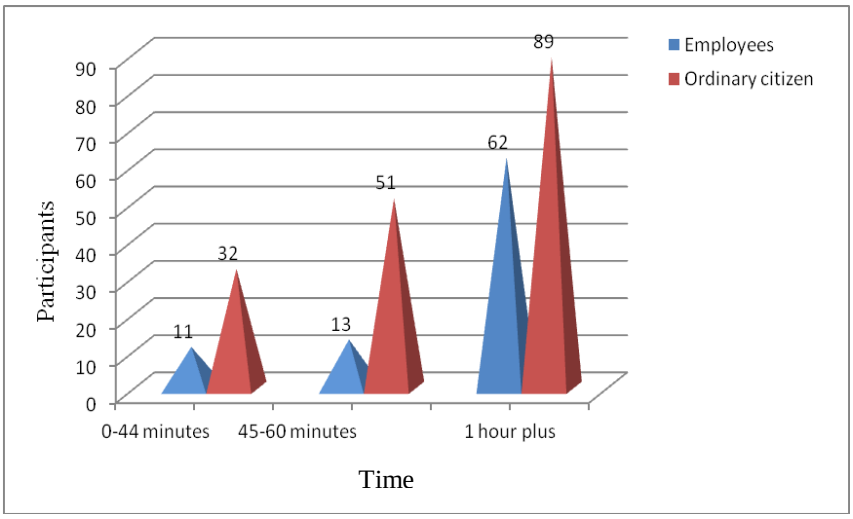

Figure 9: Time consumer on the Internet

2.4.3 Online services

The main characteristic of e-government is to provide services electronically at a higher level of convenience, efficiency and effectiveness to the citizens and other stakeholders. In the KRI there are no such online services available for the public, 95% of services are manual, except tender forms on the KRG website, and forms available on the Kurdistan Board of Investment (KBI, 2009) website for businesspersons. In addition, recently the ministry of higher education and scientific research at the KRG has managed to put application forms for students to apply for postgraduate courses outside Iraqi Kurdistan (see www. Mohe.org). The pilot survey further shows that 76% of participants (ordinary citizens) visit government offices to perform transactions, though the rest use intermediate channels means such as lawyers, or solicitors. A 56% of government agencies have websites, and 53% of the employed respondents have indicated that their agencies have plans to design websites by early next year. Most web sites though present just news and their activities and not much online interaction and transaction. However, recently in December 2010 the passport office in the city of Suleymani transformed the agency in order to provide announcements via SMS through mobile phones to inform citizens for its completion of their passport. In addition, the authority allocated a particular hall for citizens for waiting and using electronic tickets for service provision. Furthermore, in the city of Erbil the traffic police officer, calls applicants

to come to the agency to receive their driving licence using a mobile phone. That shows some individual efforts by some government institutions; however the weaknesses of these efforts are the lack of any strategy and no legal framework, and all these should be framed in a proper model.

2.4.4 ICT infrastructure at local government

Most of local government institutions in the Kurdistan region have a separate ICT department that is responsible for all their information technology needs. A 57% of the employed respondents answered "yes" for the availability of separate ICT departments in their agency. However, these departments are not active in the context of e-government initiative. In particular, many municipalities in Kurdistan already have a fundamental ICT centre in place. Though, there is almost no use of ICT in the interaction of the government with the public. In the case of the municipalities in Kurdistan, ICT use is very close to nil. Finally, 63% of the employed respondents indicated that their agencies have no master plan to guide its future e-government initiatives. It can be observed from the survey that there is a lack of strategic plan and lack of coordination amongst government agencies. Also there is no unified frame of reference for e-government implementation.

2.4.5 Completion transaction in terms of cost and time

E-government implementation could have a major contribution to economic development, since it could reduce the operating cost, time, and energy. In the Kurdistan Region because of unavailability of e-government systems, current government provides services to its citizens manually and this leads to delays and costs a lot when compared to an e-system. The pilot survey findings (Shareef et al., 2010b) shows that 35% of the respondents citizens spend between 30,000-59,000 ID Iraqi Dinar (equivalents to £15-30), to complete a simple transaction excluding fees which is depicted in figure 10.

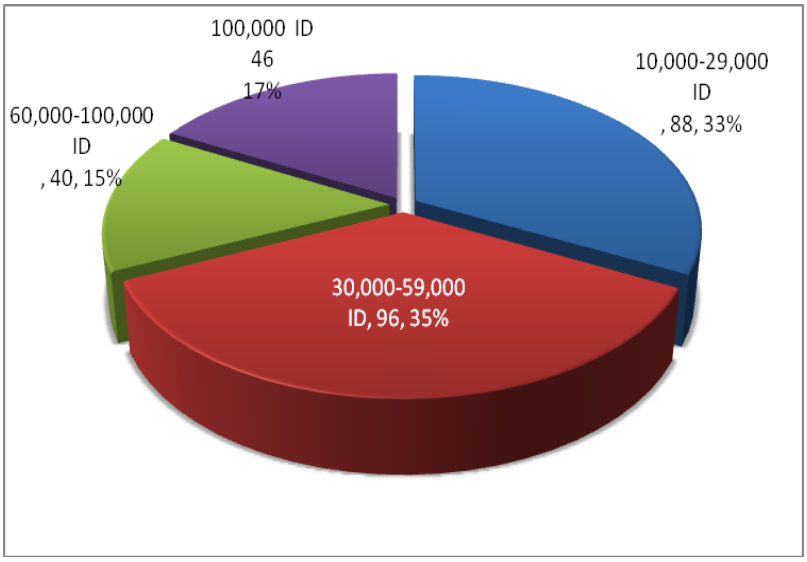

Figure 10: Transaction completion cost

54% of the respondent's citizens spend one to five days to complete their transactions as depicted in figure 11.

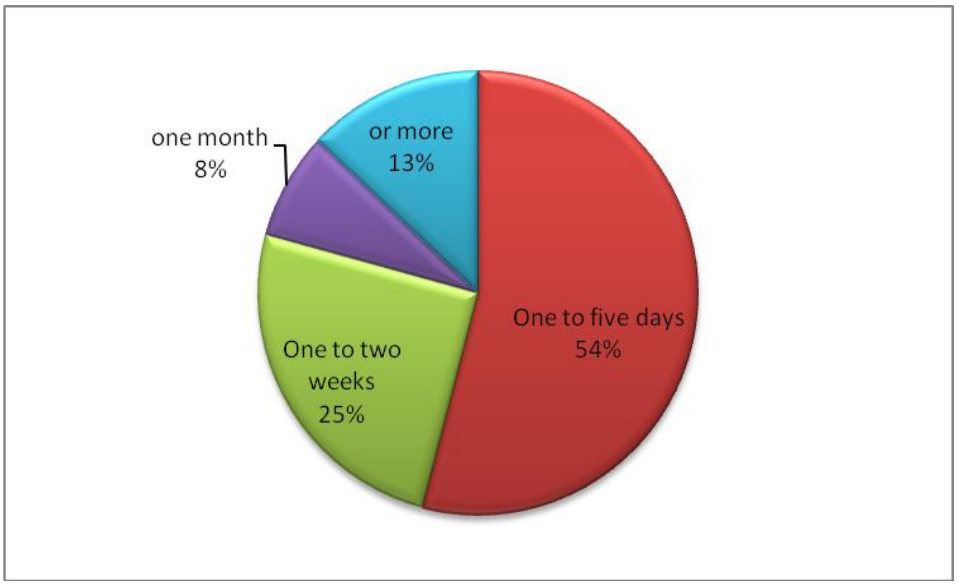

Figure 11: Transaction completion time

Moreover, 41% of the citizen respondents in the traffic police office spend 30,000-59,000 ID to complete a driving license application excluding fees as shown in figure 12.

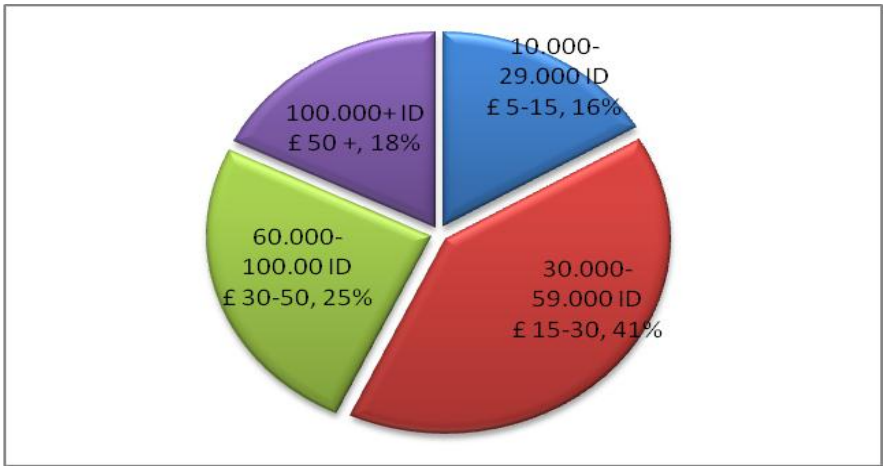

Figure 12: driving license completion cost

However, 43% of respondents from ordinary citizens indicated that they required one month, while 36% required more than one month to complete an application form and obtain a driving license as illustrated in figure 13.

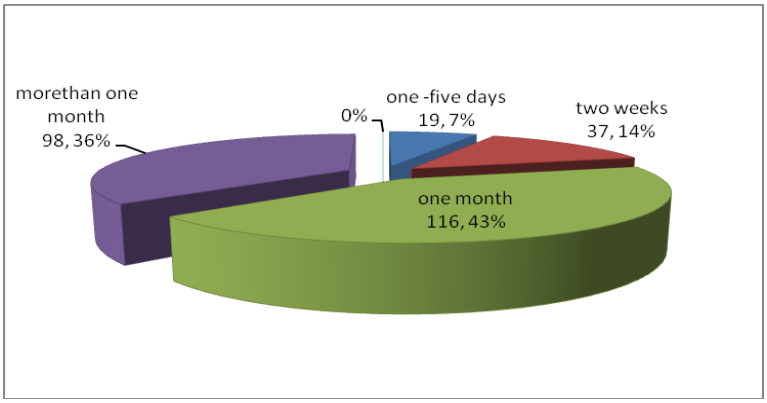

Figure 13: driving license completion time

The result of all of the above is that, citizens could be waiting a long time and could be circulated to the various institutions to carry out their transaction, resulting in higher costs of money for travel, time, and efforts. As a result, the survey shows that 70% of respondents are interested in applying for a driving license online, and 73% of respondents are also interested in applying online for house building permissions. In terms of businesspersons, 93% of businessperson respondents do not perform any government transactions online. There is only one downloadable form available on the KBI website, while 63% of those are interested in applying online for registration

to set up a company. The survey further indicated that citizens are generally not satisfied with the current government services in terms of e-service provision, and hence influences the lack of trust in government. 33% of the respondents are not satisfied, and 22% of them are neutral, while only 13% of them are very satisfied as depicted in figure 14.

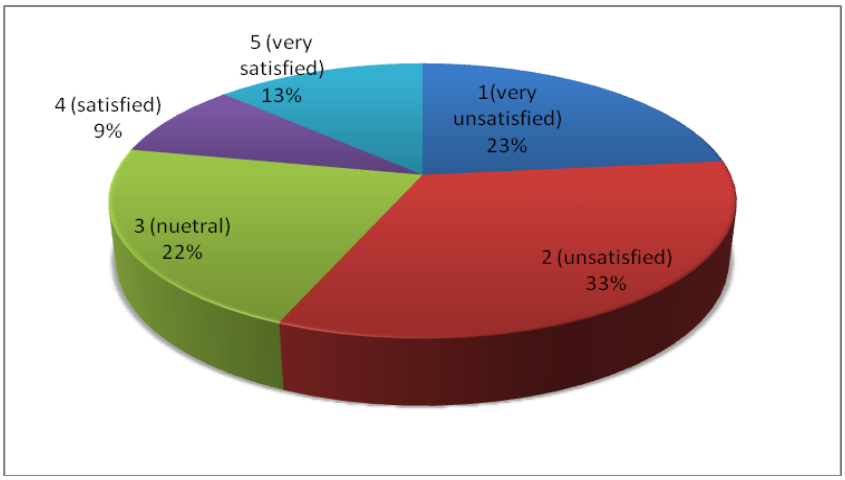

Figure 14: Satisfaction rate with current services

Table 8 demonstrates the overall percentage of participants in the pilot survey interested in getting these services electronically. Table 8 shows that there is lack of e-services available in the KRG's institutions due to lack of serious effort and lack of a unified frame of reference for e-government implementation.

Table 8: Overall interested services online (Shareef et al., 2010b)

Services available	**Citizens interested online**
Driving license application	70%
Renew driving license	70%
Demolish and building, permission	73%
Tax paying	49%
Passport application	76%
Banking (transferring money)	77%
Apply to University	80%
Enrolling in a University	82%
Accessing to the library	78%
In class learning	79%
Business License application and renewal	93%
Applying to set up a company	63%

2.5 Benefits of electronic government

The initiative and employability of the e-government strategy has tremendous benefits for government in the providing of information and services to stakeholders more effectively and efficiently. The following are g**e**neral benefits of an e-government initiative system (OECD, 2010; Pokue, 2009; Brown, 2007; Zahran, 2003; ESCWA, 2003) that encompasses:

1- Raising the effectiveness and efficiency of the government services to citizens and all other stakeholders.
2- Reducing illiteracy, and digital divide.
4- Provision of high quality of services 24/7 basis to stakeholders through various channels.
5- A high opportunity for business person and investors.
6- Major contribution to economic development, and assisting the flow of business.
7- Raise the level of transparency and accountability, and hence might facilitate to reduce the corruption.
8- Reducing the operating cost in terms of transaction with the government, time, effort, and cost saving.
9- Reducing the government bureaucracy.
10- Reducing the complexity of government administration and bringing citizen and government closer together or enhancing internal government's functions and process.
11- The ability to access government services and information anywhere, and anytime.
12- Opportunity of collaboration among government institutions, and promote integration and data exchange.
13- Increasing the level of consumers/user satisfaction from services provided by government.
14- Augmentation of job opportunity.
15- A high degree of integration and collaboration between government sector and private sector.

16- Increasing citizen contribution in political activities and decision making in government, includes e-voting, and e-democracy, and
17- Centralizing some functions, thus reducing cost and redundancy.

2.5.1 Key drawbacks of the current KRG system

According to the survey questionnaires and interviews (Shareef et al., 2010b) carried out in Erbil. The current government has some disadvantages. The following are some of the disadvantages of the current KRGs service provision:

1- Unavailability of updated information and documents which has increased reliance on the system developer.

2. Unavailability of electronic transactions, except to tender form downloads on the KRG web, and KBI website. Leading to more waste of time, energy, and money

3. An obsolete administration system that increased time process or delay processing and effort during service provision.

4. A disintegrated system of which does not allow exchange of information between various institutions.

5. The obsolete / old technology system is in use due to continued dependence on the old legacy system.

6. Lack of computerized system functionalities.

7. Massive cost expenditure due to unavailability of computerized system.

8. Inefficient, less transparency and more availability for corrupted system administration and,

9. Lack of collaboration between different ministries and government institutions.

2.5.2 Key advantages of the current KRG system

The current system has no major advantage, according to some of the citizens' perspectives. The following are some of the advantages were identified (Shareef et al., 2010b):

1- Less risk in terms of trust, security and privacy.

2- Most of the transactions occur physically which associated with culture attitude, in other words many people prefer face-to-face communications culture rather than online transaction and,
3- Depiction of high cost of equipment such as hardware and software application solutions.

2.6 Critical challenges influence e-government initiative in KRI

Due to the spread of the ICT, particularly internet, stakeholders can easily use the available services through an e-government development system. This development has associated with various challenges that influence on surmounting e-government implementation. These factors and challenges are affecting the e-government adoption, with the most noticeable ones in technologically developing and even developed countries (Sweisi and Adams, 2006; Al-Sebie and Irani, 2005). According to the head of the IT department at the council of ministries, the current government system is facing several challenges that should be solved to prepare for e-government initiative (Shareef et al., 2010b). He specifically focused on the lack of interoperability (Zhao, 2010) and lack of inter-institutions coordination between ministries and government institutions. This might make an e-government initiative difficult, because every ministry is carrying out projects independently without referring to other agencies or sharing the information with other related ministries to uptake the project successfully. The factors to focus on to avoid such challenges were also identified with the findings summarized in table 9.

Table 9: E-government Challenges

Technological	Economical	Societal	Political
ICT infrastructure, heterogeneous technologies	High financial resources	Citizen awareness	Strategy vision and missions
IT and Internet skills	Cost, time, and effort during transaction	Human capacity building, Internet penetration	Policy issues and legislation
Computer and ICT literacy	Financial funding and, budgets	Culture attitude, poverty Partnership	Weak of education system policy
Education learning capability, and Inter-operability of computer system		interoperability ,collaboration of public/private, Resistance to change, Ease of access and usage	Leadership role, involve, support, motivate, and influence
International connection networks, and updated applications		Citizen participation, Poor of information quality and System acceptance, Social networks	Legal framework of public process of government, lack of standards
		Privacy, security, trust, and Level of stress. Citizens requirement and their views	Lack of management skills, and Data Protection

2.6.1 Technological challenges

The potential impacts of ICT on business and administrative processes were already known since the early 1970's, but the corresponding economic and social dimensions were more recently considered with some delay (Vehovar, 2006). Nowadays, the lack of ICT infrastructure and heterogeneous technologies will increase the digital divide (Mausavi et al., 2008). Therefore, ICT infrastructure is one of the fundamental challenges that are facing e-government implementation in developing countries (Heeks, 2008; Gupta et al., 2008). ICT infrastructures are well established in developed countries, but remain as one of the main challenges for developing countries; such as Iraq in general and Kurdistan in particular. The survey reveals that most of the institutions in the KRG are equipped with computers and internet connection that will enhance the ability of employees to use the technology and collaborate with other institutions (Shareef et al., 2010b). However, the internet is used only by managers and ordinary employees do not have access to the internet. The research revealed that this is due to the availability of the centralised administration system along with the lack of knowledge by some of the managers

and policy makers. Despite the connection of all ministries together via fibre optic cable, this will directly simplify the pace towards e-government initiative in the KRI. But the interesting point is there is no virtual connection of this significant project. In other words there is no use of any software in this project to perform any transaction. Apart from that, the quality of the internet is not that good as to be able to provide information promptly and continuously. Most of the computers in the institutions are used for music and games. This is because of the lack IT skills and of course unavailability of a strategic plan and employee's awareness for the e-government initiative. Most of the e-government maturity model published in government information quarterly dedicated that progress of e-government is a matter of technological and organisational complexity (Layne and Lee, 2001).

2.6.2 Economic and societal challenge

The high financial resource is one of the primary challenges that face the e-government initiative (Rose and Grant, 2010). The traditional government channel services such as telephone and physically visiting offices in particular which require more money for any government transaction (Aichholzer and Schmutzer, 2000). While the implementation of e-government system, also requires a considerable budget to create an efficient system. One of the important societal challenges is that of "trust". In many developing countries people do not trust their government, especially where there has been a bad history dictatorship, or instability of the political system in some developing countries such as previously in Iraq. It is vital to ensure and build trust in government among citizens, and hence this will lead to the success of the e - government system (Zaheer and Harris, 2006).

Trust is one of the fundamental challenges having an impact per se and influencing e-government implementation (Bannister and Connolly, 2011). To achieve the trust in government among stakeholders, citizens and other stakeholders will be partners in the e-government efforts. In this regard, Yu and Liu (2001) discusses that trust is becoming a vital issue in the design of information system. However, Eastlick et al. (2006) states that trust and commitment are mediating agents among entities online. Therefore, the desire for cultivating trust amongst stakeholders of e-government is

considered as a primary principle in designing and evolving successful e-government systems.

The main feature of trust is how government can encourage stakeholders to use e-services and participate in the new system also how to increase the level of trust in government. Government requires and encourages its citizen to perform their transaction online that means placing their trust in government. In addition, Jahankhani and Varghese (2004) explain the three kinds of trust namely; characteristic-based trust, process-based trust, and institutional-based trust. These types of trusts are vital in encouraging citizen participation in e-government systems and are beneficial for the continuous progress and evolution of electronic commerce. Al-Khouri and Bal (2006) also identify three schemes to solve the trusted authentication medium for e-government services, by utilising developed technology national ID schemes namely; smart card, biometrics and public key infrastructure (PKI). Furthermore, Dutton et al. (2005) argue that the privacy and security of citizen's information are vital issues to enhance trust in e-government services and suggested that to enhance trust technologies such as firewalls and authentication systems assist to evolve citizen trust in government website. Therefore, e-government models in the developing world should consider the issue of trust in government *(*Savvas et al., 2006; Bolissian et al., 2006).

Furthermore, the other significant challenge which influences e-government initiative is the security and privacy. Wide broad development of ICTs in government sector facilitates a major amount of information to be massed about citizens. The effectiveness and efficiency of electronic data management enhanced integrated citizen information, while it also initiates complex needs for processes and control. Though the possibilities of negative effects for citizens are raised due to the significant use and integration these technologies propagate. It is known that the country is the largest authorized collector of citizen information, the possibility of these fears becomes higher and it is not completely mistaken. Accordingly, if we correlating between the development and integration of technology and the amount of data collected by e-government process. It will be deduced in an exponential development of data collection thus in the vitality of privacy and security (Kessler et al., 2011).

Privacy is a significant factor that is facing electronic government adoption; government gathers huge amounts of data of their people via daily transactions. This data will expand with growth in scope and popularity of e-government services. Privacy in terms of e-government services can be considered as defensive of personal information that is collected by the government. Managing this type of challenge is vital in order to encourage citizens for using e-government services, and increasing the citizen's trust of the new system. The main concern of citizens is the privacy and security, when using their personal information to perform any transaction with e-government services. Particularly, businesses are concerned with public perceptions about the privacy and security of information on the Internet (Hiller and Bélanger, 2001).

In order to secure citizens' information it is necessary to know the security of information. Information security is the process of recognising events which have the possibility to experience harm or threat and taking actions against in order to eliminate and reduce this threat (Schechter, 2004). The security of information can be referred to the old time civilisations when civilisations began to take models in order to communicate freely without any risk of eavesdropping. For instance, the Egyptians began adopting cryptography in 3000 BC applying Hieroglyphics (Schneier, 1996) in order to hide writings from an unintended receiver.

The development of new technology has created various security methods to secure information to individuals, organisations, armies and nations. These methods are varied in terms of the context; some were based on rules, regulation, policies and mathematical approach and others based on pure cryptographic knowledge. For instance, in the early 1970s Bell and Lapadula model was developed (Bell and Lapadula, 1973), the model aims to secure the confidentiality of military information. Later in 1985 McLean (Mclean, 1990) introduced a new method of the security field expressing a threat of secret channels that permit a bypass of the security rules. Since the number of security models augmented, the challenges continued to increase and researchers continued to investigate to find out various solutions via new models and development of existing once.

The aims of some models were evolved to offer security across the boundaries of multiple organisations such as "Multilateral Model" (Sadeqhi and Stuble, 2005). However, others were evolved to protect computer system such as "Multilevel

Model" (Thuraisingham, 1995). The wide uses of the internet and e-government and other e-world development have augmented the value and power of information to the government authorities. Hence, information security has developed to be the vital factor and supporting constituent of the internet spread.

With the privacy and security information system people feel safe and secure in their online information and service activities. In other words if stakeholders are not sure about the way that their information will be treated and have some privacy concerns they do not go online to conduct their transactions with government institutions. The government institutions should guarantee the citizen's personal and financial information will not be used against the citizens later. The government should also construct a secure strategic plan, the privacy policy standard and Data Protection Act will be considered. In order to guarantee that citizen information will be secure and save via a simple user interface, which would benefit the creation of privacy statements for implementation on e-government websites. Since it is not easy to interpolate privacy protection after a system is built. The government should also train and educate government employees on the importance of privacy, and design applications that optimize privacy protection. Furthermore, the government should find a mechanism to limit access to personal identities that do not automatically allow employees to access the database of personal information. According to citizen respondents, 84% of the citizens in KRG appear to have faith in e-government initiative, but this might not be an accurate figure as there is no such online transaction in the region yet.

2.6.3 Political challenge

Any country governed by the rule of law, transparency, human rights and accountability will make a successful country (Shareef et al., 2010b). Therefore, to implement a proper e-government system it is vital to put in place a suitable regulatory and legal framework (Chittoo et al., 2009; InfoDev, 2002), in order to protect citizens' rights and their information. Iraq is an unstable country in terms of political and economic issue **(**Bailey and Atkinson, 2008), precisely the political process amongst main three parts in Iraq such as Shia, Kurds and Sunni parts. The relationship between the federal government and the KRG is not normal, due to

some disputed territories of the country such as Kirkuk. Kurds want to bring it back to their original Kurdistan region while others not. Despite that there is an article called "*Article140*" which was constructed according to the Iraqi constitution to solve this issue. However, all the Iraqi prime ministers do not implement it accurately with their allocated time (Talabany, 2007). In terms of the financial there is always the problem regarding Kurdistan's annual budget between regional and federal government. Those problems affect strongly the implementation of any strategic project such as e-government system in terms of budget, flow of information, and democracy in the political process.

The government should be separate from politics, while in Kurdistan politicians are running the country. In other words the intervention of politicians in the public administration system affects negatively on the quality of service delivery and of course creates a non transparent environment and lead to lack of accountability. Therefore, e-government should have a standard and strategic policy plan and should not be managed by politicians; however it should be managed by professionals and technocrats and of course supported by politicians. In addition, the lack of coordination between ministries and government institutions is the main issue facing the KRG, because each ministry develops its own system independently from other ministry. One of the limitations in the KRG, is the lack of direct contact can result in multiple iterations, lack of inter-cooperation who is working in the government administration system. Therefore, all above mentioned challenges should be considered in order to establish a successful e-government.

Chapter Three: Critical analysis and discussion

Electronic government is nowadays vastly becoming a feature of the public sector in developing countries. In essence, e-government on a world-wide scale is aimed at utilising ICT to improve delivery of government services to stakeholders for enhanced accessibility, effectiveness, efficiency, and accountability. Various government officials or consultants presume that the e-government system creates innovation. However, innovation occurs when e-government determines how to configure a strategy to satisfy citizens and to success system. The e-government system should change the form to focus less on technology and more on the citizens-centric based approach and perhaps the processes involved in decision making. Thus, e-government is predicted to play a significant role in service provision to the public and governance in the future.

In this regard, since the last decade various e-government models have been recommended and proposed by academic researchers, international organizations and consulting companies (UN, 2010; World Bank by Khalil and Lanvin, 2002; Gartner by Baum and Di Maio, 2000; Accenture, 2003; Layne and Lee, 2001; Reddick, 2004). These prominent e-government models which have been proposed are based on the supply side and technological context. Consequently, it is necessary for an e-government to investigate a model based on both supply and demand and precisely to focus on the demand or citizen-centred based approach. This approach will be capable to encourage citizens to get involve in decision making and also facilitate e-government services in regional governments in developing countries.

This chapter therefore aims to analyse and review various e-government stage models in the literature which was proposed by international organisations, consulting companies, and individual researchers. Thus, it will highlight the importance of the organisational readiness and the impact of the environment. The selection of these e-government models are based on their usability and adopted by various developing countries such as Bahrain, Dubai, Jordan, and others. Also such models are proposed by well known organisations such as UN, World Bank along

with consulting companies such as Gartner and Accenture. Further models are proposed by researchers published in Journals and conference proceedings.

This investigation provides an opportunity to find out the key points behind this development, and learn lessons with the potential to identify the appropriate components, and then adopt the proposed model. The researcher then analyses one of the developed and well known e-government models in developed countries to explore the opportunity to apply the developed e-government stage model into the developing regional government such as KRI.

3.1 E-government Phases or Stages

Generally, there are three main approaches in developing and designing e-government models. The first approach comes from the international organisations such as; UN (2001, 2003, 2005, 2008), and the World Bank (Khalil and Lanvin, 2002; APEC, 2004. The second approach is provided by the consulting companies such as Gartner group (Baum and Di Maio, 2000), and Accenture, 2003. The third approach is proposed by researchers such as (Layne and Lee, 20001; Hiller and Belanger, 2001; Howard, 2001; Wimmer and Tambouris, 2002; Moon, 2002; Curtin et al., 2003; Reddick, 2004; Darral and West, 2004; Siau and Long, 2005; Andersen and Henriksen, 2006; Mousavi et al., 2008; Zarei et al., 2008; Al-Khatib, 2009; Lee, 2010a and others).

3.1. 1 First approach:

The first approach has been designed by the UN (UN, 2001, 2003, 2005, 2008) for developing an e-government model, comprising the following stages;

1- Emerging web presence: At the first stage the web presence is limited to publishing political and organizational information within an independent government static website, and there is minor interaction with citizens.
2- Enhanced: In this stage government offer more information regarding public policy and governance, such as rule and regulation.
3- Interactive: In this stage the government's web will expand by offering specific information and dynamic content, connections and links to other

pages. Government provides services online such as downloadable forms for tax payment, and license renewal.

4- Transactional: The fourth stage, government begins with two-way communication between government and citizen. For instance, taxpaying, driving license, applying for an ID card, birth certificate, and others. All services happen online at this stage.

5- Connected: At this stage government developing an integrated back-office infrastructure. This stage is characterized by: vertical and horizontal connection, connection of the infrastructure, and the connection between stakeholders.

The other international approach is by the World Bank (Khalil and Lanvin, 2002), comprises of three stages;

1- Publish: At the publishing stage large volumes of information regarding government are published on the web for citizens, business, and other stakeholders. This includes various information regarding rules and regulations, also offering access to its citizens to use this information without visiting offices and stand in a long queue or pay bribes to get service earlier. This service provision requires local language content, arranging suitable landmarks for obtaining information online. Also requires suitable and easy use of a website in order to be for everyone to access the services.

2- Interact: The second stage involves the two-way communication such as providing official email and the feedback forms from users to submit their comments regarding legislative or policy proposals. Encouraging and engaging citizens to cooperate in the design stage.

3- Transact: The final stage which is the transact stage allows consumers to carry out transactions online. The key elements of this stage are the cost-effectiveness, improved accountability and productivity through the service provision. In addition, integrating e-government with process reform, reformation and merging processes prior to putting them online.

3.1. 2 Second approach:

The second approach is by Gartner group (Baum and Di-Maio, 2001), that consists of four stages namely;

1- Presence: The first stage aims to present a static website that distributes information about institutions' missions, a time table of the opening hours and relevant information and addresses for citizens.
2- Interaction: At the second stage providing downloadable forms on the website, email addresses for officials, important links, and the potential search engine.
3- Transaction: The third stage concentrates on building self-service applications for citizens in order to allow them to apply (i.e. building permission) fully online.
4- Transformation: In the last stage, providing a single point of contact for users in order to re-clarify the delivery of government services to make government functions more transparent for users.

3.1. 3 Third approach:

The third approach as presented by individual researchers such as (Layne and Lee, 20001; Hiller and Belanger, 2001; Moon, 2002; Curtin et al., 2003; Reddick, 2004; Heeks, 2004; Darral and West, 2004; Siau and Long, 2005; Andersen and Henriksen, 2006; Mousavi et al., 2008; Zarei et al., 2008; Al-Khatib, 2009; Lee, 2010 and others).

Layne and Lee (2001) for example proposed an e-government model which consists of four stages:

1- Cataloguing: At the first stage information is propagated online, and there is availability of downloadable forms and services online.
2- Transaction: The second stage is the capability of online transactions that are supported by databases.

3- Vertical Integration: In the third stage government services connected with the state or national government services that have similar or identical functions.
4- Horizontal Integration: In the last stage the government institutions are integrated with various functionalities in order to provide one-stop-shopping service for users.

In the context of the UN's e-government model argued the automation of back office at the last stage. However, without automating front/back offices how can transaction occur? While stated in the transaction stage there is a two-way communication. Therefore, the researcher believes that the infrastructure of front/back offices should be initiated at the early stage at least for certain government institutions, in order to provide an opportunity for government authorities to process citizen's transactions accurately and promptly. Furthermore, the model made no reference to the availability of multi-channel delivery of services in any of the stages. While, multi-channel delivery of services is a part of an e-government system and it is essential to provide various channels in order to serve the entire stakeholders (Vassilakis et al., 2007). For example, elderly and disable persons have specific requirements (EC, 2004; Ishmatova, 2009; Moh et al., 2009) and need explicit channels. In contrast, the main significant feature of this model is the focus on citizen participation or e-participation approach.

The World Banks model indicates the dissemination of information of benefit to citizen in their daily lives, and highlights on the local language content. The first stage mentioned the posting of rules and regulations on the government portal or website. However, no reference to the importance of technology and legal infrastructure, also no indication of the sub-portals for government institutions which will assists citizens to access the services easily (Layne and Lee, 2001). Another vulnerability of this model does not refer to multi-channel delivery of services and also no reference to the management and administration process of the e-government system in which the robust management procedure will success the system (Heeks, 2006). Furthermore, the model did not indicate the challenges that affect e-government systems such as technological, societal, economic and political (Shareef et al., 2010b). In this regard, it is uncertain that technology can completely replace, for instance, face-to-face channels, particularly in developing countries where

cultures and interpersonal traditions are extremely anchored (Sahraoui, 2005). Nevertheless, this model has significant attributes such as focusing on public engagement which poses one of the main success factors to build citizen trust in government.

The second approach as proposed by the Gartner group which is a simple and brief stated where it is not necessary to start at the first stage and work its way throughout all of the stages. The researcher believes that it is essential to start from the initial stage and develop the system step by step without skipping any stage in order to successfully complete the system. This is due to the fact that all of the stages are interconnected together. Particularly in developing countries such as Iraq in general, and Kurdistan in particular, due to their cultural attitude and societal traditions towards technology (Sahraoui, 2005). The second stage indicates the automation of government functions. However, it does not mention the front/back office automation as mentioned by (Howard 2001). On the other hand, the last stage indicates the role of management capabilities that handle a full range of needs, questions and, problems. It does not refer to the challenges that impact the success and failure of the model such as; technological, economic, political and, societal (Coursey et al., 2007; Norris and Moon, 2005; Howard, 2001). In addition, the model argues that the transformative e-government initiatives commonly look for the removal of the organisational obstructions that encourage an institution-centric approach and, instead, encourages customer-centric approach. Though it did not address how and what mechanisms to employ to promote citizen-centric solutions and how to encourage citizens to be involved in the system. The model further did not indicate the factors that influence the participation of citizens in the system such as public awareness (Carter and Bélanger, 2005).

Another model has been proposed by Accenture (2003) consulting group, which has outlined an international e-government landscape for four years. The main aim of this model is to explain universal aspects regarding e-government leadership and offers suggestions for improving e-services. The proposed e-government maturity model comprises of five stages namely, *"Online Presence, Basic Capability, Service Availability, Mature Delivery, and Service transformation"*. This model considers the automation of front/back offices for government sectors and mentioned the encouragement of institutions' cooperation. However it did not consider citizen

participation and citizen awareness to be involved in utilising government services. Another significant point is the potential of a multi-channel delivery of services, but not mentioned to the privacy and security of citizens' information (Shareef et al., 2011b; Ebrahim and Irani, 2005). In addition, the model has not considered the issues that influence the success and failure of e-government implementation such as; technology, political economy and, societal. Further, did not mention of the relationship of government-to-employee (G2E) and government-to-Public (G2P) which should be considered to enhance the delivery of services and meet the entire public's desires (Verdegem and Verleye, 2009).

The third approach of an e-government model is that propagated by other researchers such as the four-stage model for developing e-government by Layne and Lee (2001). This approach argues that e-government is an evolutionary phenomenon, and therefore e-government initiatives should be derived and implemented accordingly. The model suggests it is the most clear and effective in the integration stage amongst e-government models in the literature (Andersen and Henriksen, 2006). However, this type of integration is affected by various factors such as political, legal and ethical that can affect this. For instance, in the last (vertical) stage, national crime, health care, police, and judiciary systems should share its database. This stage makes the process of government and its services more effective, while on the other hand, faced with the issues of privacy, and consequently a suitable legal framework is mandatory before entering to this stage (Alpar and Olbrich, 2005). This may cause a huge delay of e-government that is based on this model and it is possible that the project would never accomplish its desires. Other factors that might limit e-government development are the lack of citizens' awareness, and citizens' knowledge (knowledge divide) of the system (Shareef et al., 2011b). Layne and Lee mentioned the training of government employees, but did not mention training for citizens. Another issue that has not been considered in this model is the digital divide (Belanger and Carter, 2006) that affects e-government initiatives. Other shortages that have not been addressed such as the functional requirements as explained by (Bennett et al., 2002) and lack of service centric content which have been discussed by (Affisco and Soliman, 2006). Furthermore, the authors separated integrated stages into two stages such as vertical and horizontal integration stage. However, these two stages might be better to operate simultaneously. In other words the

communication between local government agencies and the communication between regional and federal government can occur simultaneously in the integration stage.

Hiller and Belanger (2001) performed a growth model similar to that of Layne and Lee (2001). However, Hiller and Belanger combined their stages of the model with the more important types of e-government relationships. The model consists of five stages such as; "*Information, Two-way Communication, Transaction, Integration and, Participation"*. The main significant feature of this model is the potential of the availability of information in an accurate and timely manner. In addition, the availability of various sites for actual transactions for citizens gives opportunities to citizens to communicate with government thorough web-based self-services replacing public servants in these situations. However, the front/back office automation has not been considered at the middle stages. Although, front and back-ends are two major strategies for enhancement of services and must be considered (Germanakos et al., 2005). While the back-end automation mentioned in the integration stage will affect the online transaction at the middle stage. The authors indicated the role of the political participation at the participation stage. However, they did not consider public awareness to encourage its constituents to get involved in the use of e-services and also in political decision making. Furthermore, the authors mentioned the privacy and security of the participant, while they did not mention the managing procedure for e-government sectors and the role of leadership. In addition, there is no consideration to the potential of multi-channel delivery of services, which will provide an opportunity to the entire stakeholders to get benefit from the system (Pieterson and Ebbers, 2008). E-government can involve electronic relationships between government and different levels of citizens. The first relationship identified by Hiller and Belanger is the delivering of services to individuals. At this point, the government establishes a direct relationship with citizens to deliver services such as citizen's information requirement for a service. The second relation is the democratic process, and involves the relationship between the government and individuals in the political process, such as voting online. The third relationship is the relationship between government and businesses (G2B), such as online taxpaying. The fourth relationship is G2B in the marketplace, since an important major part of an online transaction between government and businesses involve procurement decisions. The fifth relationship is government and workforces,

such as using the intranet to give information on employee benefits. The last relationship is G2G in which government agencies collaborate with each other, for example, the federal bureau of investigation sharing information online with other levels of government.

Many scholars have presented various models for initiating e-government. Howard (2001) described e-government development into three stages, namely "*publish, interact, and transaction"*. In the first stage, the government has a basic electronic presence with limited published information such as the information about government and its activities. In the second stage, the citizens are able to exchange information with government institutions through e-mail and "*chat forums*", to make queries and enquiries such as asking for a specific government policy issue. The last stage happens when the government provides services to citizens in a transaction process by way of through internet portals for services such as purchasing licenses and permits. The vital and significant characteristic of this model is the availability of portals that enable consumers to utilise the services anywhere and anytime. However, the author did not consider the potential of alternative channels in order to enable all stakeholders to get benefit from the services provided by government (EC, 2004). In addition, Howard referred to some challenges that affect e-service provisions such as the digital divide, which did not address how to handle this hurdle (Mausavi et al., 2008). Furthermore, Howard indicted the importance of the back office automation to sustain seamless delivery of services to its citizens and businesses. However, e-government should also improve internal processes such as internal effectiveness of government administration (Germanakos et al., 2005) and management; also they should consider the citizen participation in decision making and their privacy that will effectively impact on the success of the e-government (Parasuraman, 2002).

Additionally, Wimmer and Tambouris (2002) introduced an e-government framework with the aim of keeping integrated modelling of e-government services in the public area and the synchronisation with the relevant technical progress. This framework considers various factors that impact on the development of government services, they also present various terms such as life-events, public services and relevant processes. One of the main limitations of the framework is that there is no consideration of the government institutions as a consumer of the services. Merely

has being considered as a provider of services, while considering only citizens and businesses as consumers for e-government services. In addition, there are other limitations which have not been considered; such as citizens' knowledge (knowledge divide) (Shareef et al., 2011b), citizens' awareness, trust, privacy, security, and the intervention of politicians in administration and service provision. This is the main barrier and influences the administration, education, business and management sector (Shareef et al., 2010b). Generally in describing users of e-government services, four sorts of relations should be taken into consideration such as G2G, G2C, G2B, and G2P. Researchers (Wimmer and Tambouris, 2002) only considered G2C and G2B. However, G2G and G2P (government to public) i.e. for truism and visa application are vital and has not been mentioned to these relationships.

There are some other e-government approaches which describe e-government progress from national to local government and view the difficulties and complexity during this development (Edmiston, 2003; Moon, 2002). According to Moon (2002) several local governments are establishing e-government initiatives after federal initiatives for developing e-government. The discussion and explanation on various stages and phases of e-government shows the potential to transform government in the communication with stakeholders. Whereas these stages and phases show the correct way for providing e-government initiative according to (Gil-García and Martinez, 2005; Reddick, 2004), there are substantial variations of these stages among national and local government. Gil-García and Martinez (2005) discuss the expansion or growth of e-government initiatives; they start first at the national level than at local level. In other words, the development and expansion of e-government at local level begins after the national level. Moon (2002) also states that "*...following the federal initiative, many local governments also adopted IT for local governance*".

Reddick (2004) refers to a model that consists of two stages which are cataloguing and Transaction of information on a web. Also identifying that the increase of e-government is not linear as mentioned by (Layne and Lee, 20001) and used an S-shape theory. He shows the number of users of e-services will not increase at the beginning of launching e-government services. Reddick (2004) also refers to various e-government relationships such as G2C, G2G, and G2B, where findings revealed that e-government expansion is obvious in some relations than others. G2B in the

online procurement of office equipments and supplies, which is the most, advanced e-government relations that have been gained so far. Furthermore, his findings demonstrated that G2C relations are at the cataloguing stage. On the other hand e-government G2G relations are at the development level, with the use of Ethernet or intranet for government employees.

Reddick (2004) stated also that e-government still has not managed to reform the way that the government functions. This is due to the reality that e-government development has not yet finished the integration stage. To initiate this argument we will be facing several issues that are impacting the development of e-government from regional government to national level. One of these factors is the difference between regional government and national government. Generally national governments have more financial and technical resources than regional governments. However, regional government is more impacted by democratic control of its consumers (Gil-García and Martinez, 2005). Reddick considered empowering the citizens in communicating with government online, but did not consider the encouragement of stakeholders to participate in the e-government system (Verdegem and Verleye, 2009). In addition, he mentioned the economic factors that affect the e-government service provision, but he does not mention other factors such as management and security of the system along with privacy of stakeholders' information (Conklin, 2007; Ebrahim and Irani, 2005). Shackleton (2004) argues about the differences between local and national government in terms of service provision in maturity model of e-government. He distinguishes e-government maturity models of 20 existing local governments in Australia. He found the majority of local government websites benefit from citizens' participation than in the national government. This is because of their transaction services which are incredibly limited relatively speaking. The reason behind this diversity is being related to local government's limited access to resources rather than the national government. Also the impact on decision making by individual users at local level communities are higher than national government.

Siau and Long (2005) recommended five different stages of e-government model using Meta-synthesis method, which includes *"web presence, interaction, transaction, transformation, and e-democracy"*. The authors did not consider the automation and development of the back-office, which should be taken into

consideration. This model concentrates on a unified portal at the transformation stage. However, the researcher believes that various portals interconnected with a main portal will facilitate the use of e-services more seamlessly and effectively (Stibbe, 2005). Furthermore, the model focused on political and citizen's participation, but has not mentioned citizen awareness to involve them to contribute into the system. Also it did not mention the privacy and security of stakeholders' information, and these should be taken into account. In addition, Siau and Long did not mention of the potential of a multi-channel delivery of services (IDA, 2004). The internal administration and management procedure should also be taken into consideration in order to establish a coherent system.

Andersen and Henriksen (2006) proposed a Public Sector Process Rebuilding (PPR) Model, which includes *"Cultivation, Extension, Maturity, and Revolution phase"*. The PPR model is different from the models that focused on technology-based perception, because the PPR is based on citizen-centric approach. However, this model will not be an appropriate model for regional governments in developing countries. This is due to jumping to the integration stage without going through other early stages and thus; these will affect the seamless flow of information. This model focused on the main key priority which is a "*Self-service*", however it did not consider the public awareness to encourage them to use the e-services (Janet, 2004). The main feature of this model is the inclusion of the front-end of an e-government system.

Zarei et al. (2008) Proposed an E-Government Development Model (EGDM) that comprises nine stages, such as; "*Strategy development, Building infrastructure, Building trust, Making a physical and electronic portal, Initial interactions and stimulation, Enrichment and multi-dimensional development, Prototyping, Integration, and Development of the ICT industry*". The proposed model is a more technology-based perspective rather than a citizen-based perspective **(**Jellinek, 2010; Tassabehji, 2005). More to the point, the authors in stage one mentioned to the establishment of the relationship between G2G, G2C, and G2B, but the researcher believes that these relationships should occur in the other stages not at the initial stage (Reddick, 2004). Stage four mentioned the single portal for information dissemination, but the researcher believes that single portals with sub-portals for ministries or government agencies are vital in order to facilitate the accessibility.

Multi-lingual use of the portal has not been considered; this will impact on the usability of services. Zarei et al. (2008) stated the importance of cultivating trust in government in stage three. However, it did not indicate the citizen's awareness and how to encourage citizens to use an e-government system. In other words, how government can improve and develop citizen's trust in government without encouraging citizens to utilise the e-system? Afterward, the authors in the integration stage did not indicate the relationship and coordination between regional government and state or federal government, also the coordination between government institutions respectively (Layne and Lee, 2001). Finally and most vitally, the authors did not mention the potential of a multi-channel delivery of services. Also the primary factors that influence e-government implementation such as privacy, resistance to change, digital divide, IT skills, culture attitude, political process, and legal framework (Coursey et al., 2007; Norris and Moon, 2005; Carter and Bélanger, 2005).

Lee (2010a) analysed 12 e-government models, and a qualitative meta-analysis has been conducted against these 12 models. Throughout reciprocal translation and synthesis of translation, it identified a number of metaphors and developed two themes namely; citizen/service and operation/technology. The relationship between stages of each of them indicates five separate metaphors as such; "*presenting, assimilating, reforming, morphing and e-governance".* The author argues that process management should be situated after the transformation stage. But the researcher believes that management process should be sited at the early stage in order to manage the entire operational process adequately and properly from start to the end, which is a vital point to successful government (Heeks, 2006).

Lee (2010a) also argues that no every government should go via the first stage to advanced stage, but the researcher believes, for regional governments in developing countries. It is essential that the government paces from initial stage towards advanced stage, in order to enable consumers to follow the procedures easily. Also intermediary stages should not be skipped, in order that the process will not fail, due to all of the stages being interconnected to each other. For instance, how can citizens participate in government decision (e-democracy)? If a back-office operation is not being automated and is not working properly especially in terms of a technology perspective (Germanakos et al., 2005). Also how will participation procedures be

conducted? On the other hand, if a citizen does not know about government information and policies which are located at the early stages, how can he/she utilise e-services (Parasuraman, 2002)?

The most considered e-government models which have been discussed above can be observed as being almost similar in their classification of phases or stages. These models seem to differ from each other as they are based on different perceptions and use somewhat various descriptions of e-government (Siau and Long, 2005; Nour et al., 2008). They evolve primarily from a technological perspective, though taking into account some organisational complexity. Nevertheless, many famous models have been proposed, but such models might not be suitable for regional government in developing countries. While their preparations and objectives are not as those in developed countries. Most of the models did not recognize the requirement for encouraging and engaging citizens in e-government. They also merely concentrate on the transformation of government services rather than automation of the working procedure (Jellinek, 2010; Tassabehji, 2005).

In addition, most of the e-government models have not considered the potential of multi-channel delivery of services (Shareef et al., 2010a; Aichholzer and Schmutzer, 2000) as an alternative form of communication with the government in order to enable stakeholders to utilise alternative and preferred channels in various cases. In essence, multi-channel delivery of services for regional governments in developing countries is essential while the user selects a channel based on their situation. For instance face-to-face interaction, and that impacts depending on the nature of service required (Bernhard, 2010; Pieterson and Ebbers, 2008; Vassalages et. al., 2007; IDA, 2004). Furthermore, most of the e-government models have not mentioned integration and automation of front/back office in certain government institutions (Germanakos et al., 2005). The integration of back and front offices together would assist the success of e-government implementation (Christina and Scharf, 2008). Ultimately, and more importantly, most of the above analysed e-government models do not include all the components and elements that are required to be in an optimised e-government model. The summary comparison of all the analysed e-government development models in the literature is depicted in appendix D.

Additionally, to enrich the analysis method, in the following section, the researcher analyses one of the top ten e-government stage models in developed countries such

as the UK, in order to find out the potential of adoption in regional government in developing countries such as KRI.

3.2 Why analysing the UK e-government stage model?

In the last decade numerous governments around the globe have been implementing e-government initiatives (Torres et al., 2005). This implementation differs with respect to range of achievements and complexity due to the increase in financial and political promises (Grant and Chau, 2005). The reasons for selecting UK for checking its compatibility to Iraqi Kurdistan are, the objectives of the UK e-government is close to the KRG e-government objectives. The UK is measured as a well developed country in terms of e-services implementation (Lee et al., 2005) and is the third most developed system in Europe (Young, 2009) in terms of service provision and fourth across the globe (UN, 2010). This growth is achieved through a Directgove portal which offers major one-stop-services for the public sector. This portal shows an example of the opportunity of utilising an individual fronting for various government institutions. The sophisticated data structures of workflow processes have been carefully interconnected with each other (Rose and Grant, 2010).

In reality, other developed states use its e-government policies based on those being employed in the UK (Cullen et al., 2003), due to their readiness for e-government implementation. This section will attempt to find a potential use of the UK model and learn lessons from developed models, to enrich the proposed model. In essence, each country has their own strategic plan for e-government associated with their desires and the involvement processes, which differs significantly. Various states concentrate on creating a correlation between government and businesses, by means of establishing interaction and transaction procedures. However, others concentrate on supporting e-democracy through broad participation (Siau and Long, 2005). Despite the fact that new technology has the power to offer the global reach and interactivity, however categorisation of e-government in some countries is based on political and cultural rather than technical factors (Millard, 2003). In terms of e-government development in European countries, Savvas et al. (2007) mentioned to the main objectives of some countries are to accomplish a good return on investment

in e-government via raising the efficiency of public administration and cutting operational expenditure. However, others vary in the way they try to achieve their objectives. For example many countries concentrate on back-office automation such as Denmark, Spain, France and Italy, while others focus on front-office automation such as, Anglo-Irish. In addition, Scandinavian countries such as Sweden and Finland are concentrating on democracy and inclusion approaches. However, Denmark seems to concentrate on decreasing operational expenses via e-government initiatives. Concurrently, Scandinavian countries are attempting to perform justice in the region in order to support the decentralising approach of their administration, aspiring to preserve their already high standard.

Furthermore, some other countries such as Austria, in order to provide services to their citizens, have offered in advance a common framework. However, Germany via its strategic program is aiming for justice in the country, by providing the same level of services throughout the country. France, apart from focusing on back-office automation is also looking into a consistent strategy for creating an environment of transparency and participation, with the aim of efficiency. Similar attempts imitate Belgium strategy and objectives too. Luxembourg has set goals for democracy and efficiency, while Holland concentrates on competitiveness and efficiency. The fundamental objective of e-government implementation in the UK is to enhance service provision, guaranteeing cost-effectiveness for those services in meeting the needs of the public sector. Modernising local government by improving and developing the quality of local services to be more effective and transparent (Cabinet Office, 2005; Livingstone, 2004). Some other European countries such as, Italy and Spain, believe that citizen satisfaction will be achieved through implementing an e - government system to overcome the key social factor such as lack of trust in politicians and government institutions. The geographical prototype of states has not been discussed intensively in terms of vision and objectives. Therefore, it is essential to identify the impact of this issue. The geographical patterns of countries cannot be the main factor for similarity in views and objectives in e-government initiatives (Savvas et al., 2007). However, for instance Sweden and Belgium, have a close relationship in terms of objective rather than Sweden and Denmark that implies there are sometimes closer correlations amongst countries of diverse geographical regions that could be based on the strategic objectives of the system.

While this research is considering investigating the opportunities of selecting the best existing e-government stage model for the KRG. It is also vital to find out the main objectives of initiating e-government in KRI. The fundamental objectives of the KRG in initiating e-government system are to establish cost-effectiveness in enhancing the services provided to the public sector becoming more efficient. Also transparent by delivering social justice and become more culturally inclusive and effective in their service provision and pastoral roles, with presumably accountability to reduce corruption. Further, to improve and pave the way to institutional transformation to develop economic processes and, offering equal opportunities for development to all people (PWC, 2009). The overall of KRG's objectives is depicted in table 10.

Table 10: The fundamental objectives of the KRG

Order	Objectives
1	Establishing cost- effective, in enhancing the quality of service provision
2	Transparency in delivery of services which leads to trust in government and reduce the gap between government and citizens.
3	Establishing accountability to reduce corruption
4	Provide equal opportunity to all citizens which leads to social justice
5	Evolvement toward economic development

From the above explanations, it can be seen that the closest system to KRI, is the UK system in terms of the objectives of the e-government. The following sections will investigate the opportunity of applying the UK e-government stage model in KRI. However, initially the next section explains the e-government stage model in the UK.

3.2.1 E-government stage model in the UK

The UK officially launched its e-government initiatives in 2001 (Ali et al., 2009). The primary aim of this initiative was to improve services, promising cost-effective e-services according to the public desires. The Labour government proposed "*Modernisation and Improvement*" agenda. The proposal aims to evolve local authorities to be more dynamic, entrepreneurial, effective, efficient, and in connection with its citizens. In 2005, the Prime Minister's Strategy Unit (Kolsaker and Kelley, 2008) mentioned the needs for a paradigm shift in e-government

thinking. In other words, there is a need for a vigorous strategy for the "*transformation of the delivery of key public services*", because only ¾ of government e-services are available. These perspectives have affected the Independent Review of Public Sector Efficiency (Sir Gershon's perspective) which advises that there is a need for strengthening planning and implementation procedures to attain high levels of uptake of e-enable transaction services. Therefore, more focus should be on the delivery of services via the established Directgov and Business Links websites.

The UK government has also established a customer relationship management program (CRM) as a key element in delivering citizen-centric public services in the UK (King, 2007). This program enables an entire call centre and the provision of traditional transactions online by utilising this program. It will assist authorities to understand their citizens better. Johnson and King (2005) indicated that the UK government's key objectives were to work effectively towards becoming 100% e-enabled by the end of 2005. In 2006, Sir David Varney led a review of the delivery of services and mentioned that Directgov and Business link sites make primary channels for government information and transactions. This suggestion was consecrated in the 2007 Comprehensive Spending Review Public Service Agreement goal to '*...migrate more than 95 per cent of the total identified websites to Directgov and Businesslink.gov by 31 March 2011'* HM Treasury (2007). According to a report by the Organization for Economic Co-operation and Development (OECD) published on the web (Young, 2009), the UK's e-government service is the third most developed system in Europe. Despite the quality of services that is provided, citizens are still not utilising the system as much as in other places such as Austria. Merely 32% of citizens utilise e-government services that ranks 11th, lower than the European Union average of 34%. Moreover, research shows that the total accessibility of UK sites for disabled people is low, which means that there is a widespread lack of disabled-enabled access to the website (Kuzma, 2010). In this regard, the report has been published by "*The Digital Champion*" Martha Lane Fox of "Directgov" sent to the Minister of Cabinet Office, she highlighted some points that the government should take into consideration in order to improve the e-government services. Accordingly, Minister of Cabinet Office Frances Maude responded "*We will use digital technology to drive better services and lower costs.*

At present we inherited contracts that effectively limit the number of people who can use some online services. And for most benefits it is simply not possible to apply online. This is inconvenient, expensive, wasteful and ridiculous and it cannot continue…"Coffey (2010). Frances also indicates the fact that the change in the direction to online services has the influence to transform the correlation between government and their entities. This implies that apart from the enhances of quality of services, there is still a lack of services usability, due to various factors such as; complex portal, lack of broadband, public awareness and others.

To understand the UK e-government in more detail it is necessary to investigate the e-government stage model. The UK National Audit Office (NAO, 2002) published a report presented to the House of Commons, which indicates stages of electronic services initiatives and its implementation. The report illustrates the five stages model, namely: *"A basic site, Electronic publishing, and Interactive e-publishing, Transactional website and, A Joint-up e-governance*". The sketch of the UK e-government stage model is depicted in figure 15.

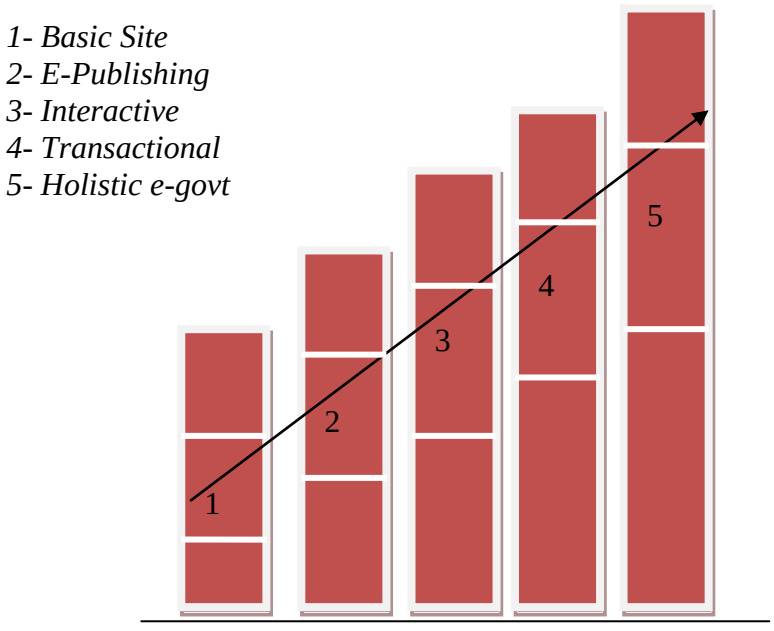

Figure 15: The UK's sketch of E-government stage model (NAO, 2002, p. 11)

The model represents the progression and the steps for service provision from stage one of a holistic e-government system. The process of five stages that follows one

after each other with the difficulty in implementation, attractiveness for citizens, stakeholders and the community also the levels of complexity of systems which are required. The stages are described below in more detail:

3.2.1.1 A basic site:

At this stage, it is proposed that the government provides core information regarding the various institutions in a variety of different formats, such as print documents (i.e. Brochure-ware) for public use. Users can contact institutions by phone or postal mail, and not e-mail. There are no downloadable forms and the portal has limited pages at this stage.

3.2.1.2 Electronic publishing:

At this stage, government institutions develop its external portal which will be a vital part of the overall communication strategy. The portal includes thousands of pages and, the institutions provide a huge amount of information online, but in a linear mode. All users only followed the one-track style. Stakeholders can download forms to fill out and send back only by post and not online. The institutions support a diffident form of e-mail contacts. However, the external portal does not connect to the institution's back-office systems.

3.2.1.3 Interactive e-publishing:

At this stage, the institution's portal is connected to some back-office system. There is also a full or partial intranet in the institution. Entire staffs are well trained on how information is published on the web, and the ability to answer questions from citizens on it. Availability of effective search tools at this stage; enables citizens to identify its address and post code in order to access only local information which can be picked from institutions' database. Downloadable forms will be available at this stage and can be submitted online. Official email contacts are widely available and email alerting services to inform citizens about new web content.

3.2.1.4 Transactional Web-site:

At this stage users can confirm themselves to the institution and register their identities properly. Thus, they will be able to perform complete transaction with the institution online, for example, creating secure payment form, fee, tax or fine. In this regard, there are two levels of such transaction. The first level, *"one-off transactions*" which is in a simple way, the system does not exploit prior information regarding the user, for example, using a Giro facility to pay their council tax through a local institutions' website. The second level which is more complex, citizens can acquire the institution's databases at different security levels, for example, to check the progress of an application they have made. This allows citizens to manage their own "account" or file with the institution, similar to "internet banking," which covers the entire set of dealings with a demand of high security.

In this stage the portal is connected completely to most of the institutions' back-office systems. Furthermore, the institution has a full intranet for staff and is connected to the portal. Also they might have "Extranet" to connect with other government institutions and other contractors. The downloadable forms are available and can be submitted online at this stage, while there might also be staged functions such as issuing ID numbers or gathering signatures that would be performed through the mail.

3.2.1.5 A Joined-up e-governance:

This stage is accomplished when the public sector portal can ease "*one-stop-shop*" online services for citizens. In other words, citizens are able to access the central government institutions in their entirety and not just the institution where the citizen has logged on. The integration of government institutions occurs at this stage. They have also the potential to connect with other government's levels, particularly regional and local governments. In this context, citizens are able to see its account or file and manage the relationships with the institution entirely through the email or internet. In addition, numerous institution use a "*zero touch technologies*" process in

which transaction does not require any active involvement of human work to be performed.

From the above stage model we can observe that the model is a mechanism for service provision. It seems to be a useful and an active advance model that will assist public sectors to perform transactions properly and effectively and also is a very important touchstone success.

3.2.2 Current electronic services in the UK

One of the key objectives in the UK e-government was to ensure that everyone has access to the internet by 2005, and also the challenges were making the entire government services online by 2005 (Bennett, 2009). However, this policy has not been achieved completely (Cross, 2010). Therefore, the Minister of Cabinet Office Frances Maude replied to Martha Lane Fox's letter that indicates to the point that he will establish a "*Ministerial working group on Digital reporting to the Cabinet Economic Affairs Committee*" (Maude, 2010). In order to enhance the e-government services through "Directgov". Also to make the portal of the UK government (Directgov) simpler and making sure that it has effective power to proceed as the "*customer champion with teeth*" to improve the consumer experience of digital public services. Directgov is the main official portal designed by the UK government in order to provide information and services to the public effectively based on "*citizen-focused digital channel*". More than ten million visitors are accessing the Directgov every month, approximately eight million individual users, creating one of the greatest developed websites in the UK (Coll, 2009).

In addition, the UK's new plan in terms of developing ICT infrastructure is the opportunity for the entire community across the country to have access to the "*super fast broadband*" by 2015, with an investment of £830m of public money to upgrade the broadband infrastructure particularly in rural areas (BBC, 2010). Thus, it provides an opportunity for all citizens to utilise internet with fast speed. Furthermore, a report published by Brown (2009) mentioned that in 2009 the speed of broadband was around 3.6Mbps and in some places can get 20Mbps or 50Mbps broadband. Virgin media attempts to offer broadband speed of 200 Mbps by 2012.

The development of an ICT infrastructure is in developing parallel with promoting and empowering local governments to enhance services to their citizens.

In this regard, the UK government was encouraging in guaranteeing local governments and their authorities to evolve a portal to meet both the aims to improve the quality of services and increase the efficiency. Local governments in the UK offer a broad range of services online. Precisely because of government motivation which helps local authorities to raise funds in order to enhance the services and applications more and more. In essence, the annual e-government National Awards Event, awards superiority across central and local government authorities. For instance, the project (Self Assessment Online service) carried out by Her Majesty's Revenue and Customs (HMRC) deduced that by the end of the January 2009 "*… 5.8 million online returns were filed online, an unprecedented 52% increase compared to 2007-08. It achieved overwhelmingly positive customer feedback, and delivered efficiency savings of £20 million"* eGNA (2009, p.10). The key objective of the project is that 73% of all Self-Assessment returns should be submitted online in 2012. In this regard, the former Prime Minister Gordon Brown also noted in the same event (eGNA, 2009) that the government will invest £30m which aims to get an extra one million people online by 2012 as a support to increase the quality of service provision. Despite this Margaret Hodge the chair of the Public Accounts Committee who was a minister in 1998, mentioned some points to the audience at the Institute of Government that "... *The civil service still fails to recruit sufficient people with the appropriate skills to manage public services in the modern world – like effective project managers and qualified IT specialists"...*Hodge (2011). In order to manage public services in the modern globe, for instance, effective project managers and sufficient IT specialists are essential. In addition, Lane-Fox (2011) indicates in her report the importance of internet in service provision to the public. However, nine million adult people in Britain are without access to broadband internet. She also proposed a scheme in order to overcome this issue and reducing the digital divide by selling computers to Britons for only £98 for those who are lacking broadband accessibility.

Currently, the UK's central government portal is illustrating the provision of many services to the public (see, www.directgov.uk). The UK's national portal was one of the top European countries and ranked the third according to the 2010 survey (UN,

2010). Approximately 50% of services are at the advanced stage such as road tax payment, Tax payment, passport application, and others. However, 42% of the e-government services at the transactional stage such as; driving license, student loan services, and others. 75% of services can be accessed online such as, Job seeker allowance, housing benefit, and others. 90% of the information and services are available on the website such as; crime, birth and marriage certificate, travel, living abroad and, others (UN, 2010). The summary of the entire services available on the UK portal is illustrated in figure 16.

Figure 16: Electronic services on the UK's portal

In the following section, the researcher investigates observations to see if the UK stage model can be applied to KRI. In order to test this, the researcher will be examining the following critical issues as identified in the literature (Schwester 2009; Ali et al. 2009; Chittoo et al. 2009; Al-Shafi and Weerakkody, 2008; Gupta et al. 2008; Ramaswamy and Selian, 2007; Alpar and Olbrich 2005). These critical issues will be discussed below in detail.

3.2.3 Critical issues identified in the literature for comparison

There are various issues impacting the implementation of e-government. In this section, the researcher investigates to find out the potential in adopting the UK e-government model in KRI. To achieve this, the following issues will be examined in terms of comparison between the current state affairs of KRI and the UK, in order to see the opportunity of the adoption process.

3.2.3.1 ICT infrastructure in KRI as compared to the UK

The personal computer started in 1980's and linked via internet in 1990's. Technological and human resources are one of the main fundamental needs of e-government initiatives and must be compatibly ready with the e-government initiative. Due to the reality that e-government depends strongly on ICT, a proper and coherent ICT infrastructure for any institution will be one of the key success factors of e-government implementation (Heeks, 2008; Ebrahim and Irani, 2005). The lack of ICT infrastructure and heterogeneous nature of technologies will increase the digital divide. In the last decade we have recognized a swift range of internet penetration in the world (IWS, 2010). However, a tremendous gulf of access to the internet varies amongst countries in terms of how fast they adopt new technology and how far they are behind (Kovačić, 2005). Therefore, it is essential to investigate the impact of the ICT infrastructure on e-government implementation in developed and developing countries.

In the comparison between UK and KRI in terms of ICT infrastructure it can be seen that the ICT infrastructure is well progressed in developed countries such as UK as explained in section 3.2.2. The ICT infrastructure still remains as one of the main challenges in developing countries; such as Iraq in general and Kurdistan region in particular. The fact is that the institutions in the KRG are equipped with computers and internet connection. However, according to the survey carried out for this research which is explained in section 2.3 revealed that, the ICT infrastructure in KRG still does not meet the desires in terms of the integration and quality. This is due to the lack of efficiency of the internet in terms of speed (download & upload),

price, and, accessibility. In addition, the internet connectivity in all government institutions is only for heads of departments and managers not for ordinary employees. Shortages in telephone land lines particularly in rural areas will also influence the usability of the internet. Furthermore, the lack of electricity in Kurdistan also impacted on the internet usability because the government provides electricity to their citizens only around 20 hours per a day in better situations, including private power generators (see www.krgelectric.org). On the other hand, there are some efforts by the Ministry of Transportation and Communication to connect around 70 government institutions together. For instance Parliament, the Presidency, of the council of Ministries, Universities and Banks will be connected via fibre optic cable (MOC, 2009). Building and improving the ICT infrastructure is critical to attain various governmental facets and thus sustain the e-government functions and enhance more effective and efficient services. ICT Infrastructure increases the operation and the efficient allocation of existing technology capacity and evolve key ICT infrastructure, hence these have an overall impact on the entire government sectors. Therefore, due to the lack of ICT infrastructure in KRI, the UK e-government stage model might not be an appropriate choice for KRI.

3.2.3.2 E-readiness of electronic technology in KRI as compared to the UK

E-readiness is the capability to utilise ICT to evolve businesses and other aspects. There are various benchmarking indexes performed by (UNDP, World Bank and Economist Intelligence Unit). However, the key issue facing the researches especially in Iraq is the data collection, due to unavailability of the latest statistic census in Iraq since 1977. Currently, there are debates amongst Iraqi politicians for the statistic census for the entire country. However, some parts of the country and their representatives from politicians do not desire to carry out this important process. Therefore, it is difficult to obtain accurate data and information from Iraqi sources.

If we compare the UK with KRI in terms of e-readiness we can observe that the UK is one of the most developed countries in the world and ranked fifth in terms of e-government readiness in 2003 (UN, 2003), tenth in 2008 (UN, 2008), and fourth in the 2010 (UN, 2010). However, in terms of KRI we can predict a wide gap between

the UK and Iraq in general and KRI in particular. According to the UN e-government report (2010), Iraq lags behind in e-readiness and the survey revealed that Iraq is ranked as 136. Table 3 shows the e-government readiness index of Iraq and some other developed and developing countries (UN, 2010).

The survey carried out by United Nations (UN, 2010), shows online services available which comprise of; emerging information services, enhanced information services, transaction services and connected services of developed and developing country websites. In terms of the UK 90% of the information and services are available on the website, 75% of services can be accessed online. 42% of the e-government services at the transactional stage and, 50% are at the connected stage, which shows the e-participation of citizens in e-government system.

In addition, as explained in section 1.7.1, in the Republic of Korea 97% of the information is emerging in the public sector, 91% of information and services are available for citizens could be one-way or two-way communication. 66% of services are at the transition stage, and 62% of services at the connected stage mean the e-participation in e-government system. Dubai is a federal government of United Arab Emirates, and its e-government readiness is ranked 13th amongst developing countries and, 49th in the world (UN, 2010). The Dubai Portal is a very promising e-government experience in the United Arab Emirates and in the whole Arab World (Al-Omari, 2006). The primary vision of Dubai e-government is to lead an economic hub, also to provide a high quality of services to citizens, business, and government institutions. Foster e-services adoption via customer management (see www.dubai.ae).

Kuwait is another developing country that implemented its e-government system in 2000 by the decree of the Council of Ministers as one of the main priority projects in the country. The project is implemented in the moving of government services towards e-business and social changes caused by the new system. The project is also aimed at facilitating the ease of accessibility of huge amounts of information, and the rising role of electronic processes in citizen's daily life (Al-Awadhi and Morris, 2008). It can be seen in table 3 that Kuwait's e-government is moving forward and is ranked the third of the Arab level and 50th in the world. Kuwait's government authority made a memorandum of understanding in 2004 with one of the best existing e-government systems which is Singapore in order to collaborate in the

implementation of the system and get benefit from their experience in this issue (see www.e.gov.ku).

According to Ciborra and Navarra (2005) Jordan is *"one of the rare countries in the Middle East with a history of commitment to good governance and ICT-related initiatives"...*Ciborra and Navarra (2005, p.142) as explained in section 1.7.5. E-government in Jordan started in September 2000 as a national programme. The United Nations report survey (UN, 2010) shows the rank of Jordan as 51st based on the maturity level measurement. One of the main advantages of e-government development in Jordan is the increase of internet penetration. Due to availability of ADSL and increasing use of mobile phones in households which was around 86% in 2007 and 94% in 2008 (Al Hujran and Shahateet, 2010). Jordan's authority introduced a new strategy called "*The Jordan Digital Strategy goal"* The main goal of the strategy is to improve the quality of services and provide them effectively and efficiently. The strategy also recommended utilising ICT to drive the way government engages with citizens and business (MOICT, 2006). In this regard the usability of Jordan's website in terms of service provision is 74% of information and services are emerging on the website for the public sector. 38% of services are available for one-way or two-way interaction, 34% of services at the transactional stage and, also 34% of services are at the connected stage implies one-stop shop services (UN, 2010).

If we compare the above developed and developing countries in terms of e-readiness, we can see a broad gap between KRI and the above countries particularly with the UK. Despite an ample gap, there are some efforts carrying out by the KRG to enhance and modernise government services. The interview carried out with the director of general of the ministry of communication revealed that there are many telecommunication companies existing in KRI. These companies provide basic services such as voice mail and text message, and the cost per call is high and the quality of services is weak based on citizen's perspective (Shareef et al., 2010b).

In addition, most of the government institutions in the Iraqi Kurdistan have a separate ICT department which are not active and not developed in the context of e-government as explained in chapter 2 in more detail. In Particular, many municipalities in Kurdistan already have a fundamental ICT centre in place. However, there is almost no use of ICT in the interaction of the government with the

public, and ICT use is very close to nil, with the lack of IT skills amongst employees and managers.

An e-government program in Kurdistan is a national initiative, sponsored by the prime minister of the region. It aims at improving effectiveness and efficiency in government services by improving the quality of service delivery to their citizens and businesses. To proceed with this plan, the IT department at the council of ministries has been created to perform the objectives of the KRG, in order to modernise and transform the government towards an effective and efficient government. The work of the IT department has started with the smart ID project as an initial pace towards electronic government (PCW, 2009). Furthermore, in 2008 KRG signed an agreement with Price Waterhouse Coopers (PWC) to create an IT strategy for KRG in order to assist government in making a strategic plan of IT and a roadmap for implementation of the project with a budget of 3.5m US dollars (www.krgit.org). In 2009 the IT academy was launched as a centre for learning and training government employees, civil society and, private sector in various aspects such as; IT skills, managing, and others. The IT website is not known by most of the public; due to lack of awareness by the public of their mission and objectives of the projects that they perform. The key findings of the survey show that citizens in the region mostly have a positive view of the e-government initiative program (Shareef at al., 2010b).

Kurdistan's government provides no services electronically, that will influence citizens' time, efforts and money. However, there are some individual efforts by some ministries such as Ministry of higher education and scientific research. The ministry intended to carry out a Human Capacity Development Program. The students and employees in any institution are able to apply online to get an offer to study MSC or PhD program outside Kurdistan (see www.mohe-krg.org). Tender forms are also available on the KRG website and the Kurdistan board of the investment website for contractors and businesspersons see (www.kurdistaninvestment.org). The researcher believes that e-government initiative in the KRI is at the initial stage.

To implement a successful government, it is important to promote citizen trust in government and its institutions. This can be achieved by convincing citizens throughout of the better service provision and thus, reduces the divide between

citizen and government. Lack of efficient performance of any of the three facets such as parliament, governmental institutions, and the judiciary system will influence and reduce trust in government. Hence, establish an unstable environment that leads to corruption in administration. Therefore, collaboration among these three parts will help to establish a coherent system. The e-government system can play a significant role in merging these three parts and make transparent system. Therefore, it is essential for the Iraqi government in general and Kurdistan region in particular to investigate and establish an efficient e-government system to enhance the public services in order to be able to decrease corruption.

3.2.3.3 Legal framework differences

Government operations are robustly regulated and driven by policy and legal frameworks that comprise of; local constitutional law, rules, and regulations. The main concern is what is required to be understood and realise the profits that can be achieved by enabling e-government. Laws and legislations, procedures and systems outwards towards the public are not only acting for the sake of technology change. To manage an efficient service delivery in the electronic environment before establishing a foundation could be created by statute or passing a law (Chittoo et al., 2009; InfoDev, 2002).

Currently, there is no overall e-government legislation in the UK. Merely some legislation regarding accessibility; *"Freedom of Information Act 2000"* which indicates to the laws regarding the citizen's rights in accessing information which is held by the public sector (e-government legislation, 2010). There are also various other legislations came to force in the UK and other European countries such as; "*Data Protection Act 1998, Electronic Signatures Regulations 2002, Electronic Communications Act 2000.* Also *Electronic Commerce Regulations 2002, The UK Public Disclosure Act 1990, Data Protection Act 1998, Computer Misuse act 1990, reuse of Public Sector Information Regulations 2005"* and, others (Duquenoy et al., 2008). One of the main UK's government strategies as set out in e-government is *"a strategic framework for public services in the information age, April 2000"* Fang, (2002). Many scholars have mentioned the implications of the lack of a legal

framework of the e-government initiative as well as a reluctance to hold change (Irani et al., 2007; Beynon-Davies and Martin, 2004).

The legal framework establishment will support services that are provided by government to the public. Hence, it will overcome the obstacles of data protection and other legal issues. Evolving suitable e-government legislation and cyber laws demonstrate legal issues, which connect to employment of communicative, transactional, and distributed facets of networked information equipment along with technologies. In accordance with that, many organisations need to adopt laws and legislation infrastructure commonly to protect citizen's rights and their privacy in a way that enable them to build a policy for establishing a robust system. For instance, e-government systems require an integrated framework that allows various institutions, provinces, and municipalities to share and exchange data with the public in a secure manner. Therefore, the government should have a clear understanding of the legal framework from both political and managerial levels.

However, in KRI there are no such legislations to offer citizens to access the government's information. Data protection, citizens' right protection, copyright, computer misuse and other rules and regulations do not exist yet in the region. Only some laws and legalisation are enacted in Kurdistan parliament such as: Investment Law in KRI in 2006, Smoking-Prohibition Law in 2007, and oil and gas law in 2007 (KRG Parliament, 2006). Enacting the required legal framework is needed in Kurdistan to support the usage of new technology and introducing standards and legislation which ensure interoperability, compatibility and secure sharing of information. Evolution of the e-government and their elements should be accepted by laws, rules and regulations of the country and should also comply with international laws and regulation (Sharifi and Zarei, 2004). In this context, the laws, rules and regulations in the UK are completely different and more developed than in KRI. Therefore it might also be difficult to apply the UK's e-government model in KRI, due to the lack of legal framework.

3.2.3.4 Cultural attitude differences

The cultural attitude might influence e-government initiatives in various aspects such as; the equality and inequality of people (men & women) in the community and, the

potential risk of the people in the society. Cultural attitudes have been broadly involved in the IS field over the past decades on the influence of cultural variations on the evolvement and use of ICT (Ali et al., 2009; Al-Shafi and Weerakkody, 2008; Ramaswamy and Selian, 2007). According to the literature, a variety of studies insist that apart from ICT infrastructure (Hargittai, 1999) and, legal framework (Al-Shafi and Weerakkody, 2008). Cultural attitude contributed to the expression of differences in internet dissemination among countries (Maitland and Bauer, 2001). In some societies the desire of internet is not an issue compared to other priority needs such as food, water, electricity, education, and health, particularly in developing countries. In this regard, Ali et al. (2009) compared the UK as a developed country and Sri Lanka as a developing country in e-government implementation in terms of culture attitude. They revealed that there is a potential effect of cultural differences in e-government implementation**.**

Most of the transactions in KRI occur physically (face-to-face) which associated with culture attitude, in other words many people prefer queue approach rather than online transaction, due to the lack of trust in government (Makolm, 2009). For example, citizens prefer to pay their taxes through agencies rather than online payment even in developed countries. In addition, the citizen desire to see the entire transaction process in front of their eyes particularly in developing countries such as Iraq in general and Kurdistan region in particular. This is due to the cultural attitude and also the quality of service delivered to the citizen and creates a lack of trust in government. Deprive of trust in government institutions creates a wide gap between government and public (Sang and Lee, 2009; Sang et al., 2009; Gilbert et al., 2004). Cultural attitudes have a significant impact on the acceptance of the e-government system and influence the usability of e-services. For instance, in some families in developing countries, the use of the internet is forbidden, due to the negative cultural perspective on the internet. Therefore, it is important to encourage and make aware citizens in order to know the benefits of the internet and its use of e-services. Thus to raise citizens trust in government (Al-Khouri and Bal, 2006; Jahankhani and Varghese, 2004). The success in implementing e-government requires intensive consideration of countries with cultural background of the society and the social aspects. Realizing cultural and social obstacles that determine the community's

availability for abiding changes in the system is among those matters (Sharifi and Zarei, 2004).

There are obvious disagreements between the existing policies of the government for the evolvement of the system, which are mostly based on the world views and plans. Adopting the global approach to the growth of the information field and citizen reaches, with some of the unresolved cultural/political matters that stem from the ruling system. The main diversity seems to be a common type for many developing countries related to their shift towards democratic societies. In particular Kurdish society, and their situation with a new democratic system, this will require taking certain measures in the adopted policies, in order to establish an appropriate strategic plan and legal framework for an e-government system. The researcher believes that the cultural values have a significant impact on any ICT project, and must be taken into consideration as a part of the e-government initiative policy.

Therefore, might also be difficult to apply the UK e-government stage model in the KRI due to the broad gap between the UK and the KRI in terms of culture attitude.

3.2.3.5 Education level differences

Developed countries and a few developing countries have now shifted their government procedures into e-enabled form, such as the UK (Johnson and King, 2005). The skilled human resources have severe impact on e-government implementation. For instance, in KRI the human resources in terms of IT literacy are inefficient and require quick and rigorous concentration and actions must be taken by the government authority. Broadened investment in the education sector and digital skill forms are a vital measure to prevent citizens being excluded from the knowledge society and reduce the digital divide particularly in the KRI.

The current policy of the KRI in terms of e-government initiative is not quite crucial and do not seem to have engaged the responsible bodies for educating and training a desired human resource in this sector. However, there is a slight effort in training government employees in the capital of the region through an IT academy to train government staff to utilise Microsoft Office as an initial stage. This academy should be activated more and cover the entire region to support training and skills for all citizens and businesses to raise their ability to work in their field effectively similar

to the "*Skill Set*" (www.skillset.org) in the UK. That will considerably enhance developing a knowledgeable society and bridge the digital divide (Ferro et al. 2011; Fuchs and Horak, 2008; Blanger and Carter, 2006). In accordance with the findings from the survey (Shareef et al., 2010b) as explained in chapter 2, the citizens in the region have less access to the internet compared to any developed country due to various issues. For instance, lack of internet quality, high cost of internet, lack of IT literacy, digital divide, seamless internet access, unreliable fixed land line infrastructure, lack of electricity, and unavailability of e-services. Government institutions- higher education authorities and other institutions have not yet intensively recommended a reliable strategic plan for reducing this divide. As they have for meeting the requirements for a skilled employees in other areas of endeavour in the region. Therefore, there is an ample gap between the UK and the KRI in terms of IT skills. This is due to the fact that KRI are facing a tremendous challenge, and actual implementation of e-government services, which are lagging behind even if compared to neighbouring countries such as Iran and Turkey.

The poverty issue is one of the hurdles that influence the educational level of people, (Tarabani, 2010) and hence increases the digital divide. According to the report published on the "*Kurd net*" website revealed that in Iraq in general 16% of the population is under the poverty line. Kurdistan in particular there is 13% of the population below the poverty line (Abdulla, 2010). The revenue level will be considerably impacted with the use of the internet. The main obstacle of internet accessibility is the high cost of the internet particularly in KRI. This is due to the unavailability of many internet service providers (ISPs). Consequently, this makes a lack of competition amongst internet service providers.

In accordance with the UK situation, in 2007 the Digital Opportunity Index (DOI, 2010), which is an e-index that measures information society, which is agreed internationally. This index is used as a tool for benchmarking the vital indicators to measure the information society. The DOI is a standard tool used by operators, government, researchers, and others to measure the digital divide. This index was evolved in partnership with the Korea Agency for Digital Opportunity and Promotion (KADO) and the United Nations Conference on Trade and Development (UNCTAD). The goal was to offer a means of measuring the digital divide of the

top 25 economies countries. The report revealed that the digital opportunity in the UK is in the top 10.

In addition, according to the Economist Intelligence Unit's report (EIU, 2006) there are six important areas to be considered to bridge the digital divide such as; *"Connectivity and technology infrastructure, business environment, consumer and business adoption, legal and policy environment, social and cultural environment and supporting e-services need to be reviewed and maintained properly"* EIU (2006). To overcome the digital divide these dimensions should be considered. However, in the KRI circumstance most of the above mentioned points are not yet achieved. Consequently, it might also be difficult to apply UK e-government model in KRI due to the lack of IT skills, education level, digital divide and, poverty.

3.2.3.6 Political process differences

The political issue is another point that influences e-government initiatives in developed and developing countries (Schwester, 2009; Carrizales, 2008; Ramaswamy and Selian, 2007). Any state led by a set of laws, transparency, human rights and accountability will be a successful country. Iraq is an unstable country in terms of political and economic issue **(**Bailey and Atkinson, 2008) precisely it is the political process amongst the main three parts in Iraq such as Shea, Kurds and Sunny parts. The relationship between the federal government and the KRG is not normal, due to some disputed territories in some parts of the country such as Kirkuk. Kurds want to bring it back to their original Kurdistan region while others not. Despite this there is an article called "*Article140*" which was constructed according to the Iraqi constitution to solve this issue. However, all the Iraqi prime ministers do not implement it accurately with their allocated time (Talabany, 2007). In terms of the financial there is always a problem regarding Kurdistan's annual budget between regional and federal government. These problems affect strongly the implementation of any strategic project such as an e-government system.

Many scholars (Lee, 2008; Irani et al., 2007) have mentioned the implications of the bureaucratic organizational structure and the lack of prudent leadership to change efforts. UK's politicians and central government have coherent support for their local governments (Ali et al., 2009), with a developed political process. Whereas in

Kurdistan some of the politicians are controlling the government administrations, businesses, and monopolising strategic projects (Shareef et al., 2010b). This will make citizens not trust in politicians and institutions. Politicians should support the public body, civil servants and, other government administrations.

Lack of support from politicians hence disable or cause the failure of e-government functions (Schwester, 2009; Chowdhury et al., 2006). Administration should be separated from politicians, and give opportunity for civil servants to reach their potential. Therefore, the government should have a strategic policy plan supported by politicians to achieve the aims and objectives of the presumed strategy in order to establish a coherent system. This support will influence management, ICT policy and capacity building process (Sang et al., 2009). Despite barriers facing governmental administrations in Iraq in general and Kurdistan in particular, the political processes however are moving slightly forward to a democratic society in comparison with other countries in the Middle East. In essence, the political freedom in Iraq is moving very slowly towards a democratic process after Saddam's regime which initiated the liberation and democratic process. This could open up the process giving opportunity for citizen-government engagement and the need to efficiently manage this through e-government. With regards to the survey carried out by "*Saban Centre for Middle East Policy*" (Iraq Index Archive, 2010). This survey is a statistical collection of economic, public opinion, and security data. It provides scores from zero to ten, ten represents high political freedom and zero represents low political freedom. The indexing project in Iraq is led by Michael O'Hanlon at Brookings. Table 11 shows the differences amongst Middle East countries in comparison with Iraq in terms of political freedom.

Table 11: Shows the Political freedom index of some Middle East's countries (Iraq Index Archive 2010, p. 23).

State	Political freedom Index
Israel	8.20
Lebanon	6.55
Morocco	5.20
Iraq	5.05
Palestine	5.05
Kuwait	4.90
Tunisia	4.60
Jordan	4.45
Qatar	4.45
Egypt	4.30
Sudan	4.30
Yemen	4.30
Algeria	4.15
Oman	4.00
Bahrain	3.85
Iran	3.85
United Arab Emirates	3.70
Saudi Arabia	2.80
Syria	2.80
Libya	2.05

3.2.3.7 Overview of differences and recommendations

This section investigates justification to all the above differences between the UK and KRI in order to find out the opportunity to apply the developed e-government stage model into the developing regional government.

Section 3.2.3.1 discussed in detail the main differences between UK and KRI in terms of technological infrastructure. The UK e-government system has a developed ICT infrastructure establishing the internet accessibility for every stakeholder across the country to "*super fast broadband*" by 2015. Investment of £830m of public money to upgrade the broadband infrastructure particularly in rural areas (BBC, 2010) consequently provides an opportunity for the entire population to use the internet with appropriate speed. The contribution of the private sector in supporting and developing ICT infrastructure in the country such as Virgin media attempts to offer broadband speed of 200 Mbps by 2012. Also it provides a fibre optic network to the UK government as part of their "*Public Sector Network*" (PSN) as an agreement signed with the UK government.

However, most of the government institutions in the Kurdistan region have a separate ICT department that is responsible for all their information technology needs. There is almost no use of ICT in the interaction of the government with public. ICT use is very close to nil, due to the lack of IT skills by employees and managers. The institutions in the KRG are mostly equipped with computers and internet connection. While, the ICT infrastructure in KRG is still under expectation due to a lack of efficiency on the internet in terms of speed i.e. 512 Kbs, cost, and accessibility. Internet connectivity in all government institutions is only for heads of departments and managers not for ordinary employees. Shortages in telephone land lines particularly in rural areas will also impact on the usability of the internet. Lack of electricity (frequent cut-offs of electricity) in the region also influences the initiation of an e-government system in which the government provides electricity only around 20 hours per a day including private power generators to their citizen (see www.krgelectric.org). Even with all of these, the availability of some mobile communication company might help in initiating an e-government system. However, the lack of competition amongst companies is due to the limited number of these companies. Slight efforts of KRG institutions to develop ICT infrastructure attempt to connect certain government institutions via fibre optic (MOC, 2009).

Section 3.2.3.2 investigated the e-readiness in the UK in comparison with KRI. United Kingdom is one of the developed countries in the world and ranks fourth in the 2010 (UN, 2010). Government provides a tremendous amount of services to public sectors, for instance 90% of the information and services are available on the UK website. 75% of services can be accessed online, 42% of the e-government services at the transaction stage and, 50% are at the connected stage which mean the e-participation of citizens in e-government system (UN, 2010). However, Kurdistan's government is at the early stage of the e-government initiative and has no certain e-services available for public sector. Only some tender forms on the KRG website and the KBI website are available. Therefore, Iraq lags behind in e-government and the survey show the e-readiness ranked at 136th (UN, 2010). In spite of these shortages, KRG signed an agreement with PWC in 2008 to create an IT strategy for KRG in order to assist government to make a strategic plan of IT and a roadmap for implementation of the project with a budget of 3.5m US dollars see (www.krgit.org). The IT academy was started in 2009 as a centre for learning and training government

employees, civil society and, private sector in various aspects such as; IT skills, managing, and others. But this centre does not cover the entire region in providing training to the public.

Section 3.2.3.3 analysed the legal framework differences between the UK and KRI. The UK parliament has enacted some legislation such as; legislation regarding accessibility; *"Freedom of Information Act 2000"* which indicates the laws regarding the citizen's rights in accessing information which is held by the public sector (e-government legislation, 2010). One of the main UK's government strategies as set out in e-government is *"a strategic framework for public services in the information age, April 2000"* (Fang, 2002). The legal framework establishment will support services that are provided by government to the public; hence, it will overcome the obstacles of data protection and other legal issues. However, in KRI there are no such legislations to offer citizens access the government's information. Examples are; data protection, citizens' right to protection, copyright, computer misuse and other rules and regulations do not exist yet in the region. There is not even any effort to propose any legislation relevant to data protection or legal framework for e-government initiatives.

Section 3.2.3.4 tackled the influence of cultural attitudes in initiating e-government in the UK in comparison to the KRI. Cultural attitude affects e-government initiatives in various aspects such as; the equality and inequality of people (men & women) in the community and, the potential risk of the people in the society. In some societies the desires of internet are not the issue compared to other priority needs. Such as food, water, electricity, education health, etc., particularly in developing countries, such as Iraq. The prior issue in Iraq in general and Kurdistan in particular is their security, electricity, food and welfare life. Citizens are not keen about the availability of internet, only young people; they are concerned about internet availability. Therefore, it can be seen in developed countries, such as the UK, the use of internet is much higher than developing countries such as Iraq in general and Kurdistan in particular. According to the survey carried out in KRI in 2010 (Shareef et al., 2010b), explained in chapter 2, the gender has an impact on the use of the internet. For example in Kurdistan internet accessibility is more amongst males than females, during unavailability of electricity at home. Males can go outside to the internet cafés, however female cannot due to the cultural and social

obstacles. Even researchers or academic staffs at the Universities have difficulties in gaining information due to unavailability of internet in their offices. Also, in a few families using the internet is forbidden due to the misuse of the internet. Cultural attitude has significant impact on the acceptance of the e-government system and influences the trust in government. Citizens desire to see the entire transaction process in front of their eyes particularly in developing countries such as Iraq in general and Kurdistan region in particular.

Section 3.2.3.5 explained the differences between the UK and KRI in terms of education level. According to the Digital Opportunity index (DOI, 2007) the UK is in the top 10 in digital opportunity. This is due to the high IT skills amongst people. In the UK there are various organisations helping and supporting ICT skills and training for private and public sector such as "Skill Set". The emergence of ICT in the education curriculum is the main factor in reducing the digital divide which is considered in the UK. However, in KRI the plan for e-government initiative is weak and does not seem to have engaged the responsible bodies for educating and training required human resource in this sector. Even so, there is a slight attempt through IT academies in order to train government staffs to utilise Microsoft Office as an initial stage. This academy is carrying out its operation only in the capital city not across the country, and this centre alone would not be able to achieve the public desires. Government should consider effective steps to overcome the digital divide issue by expanding the IT academies across the country and should be separated from politicians' inclusion. That will considerably enhance the development of a knowledgeable society and bridge the digital divide (Ferro et al., 2011; Fuchs and Horak, 2008; Blanger and Carter, 2006). There are various other factors affecting education levels such as poverty. Despite the fact that education in Iraq in general and Kurdistan in particular is free, the education process is not planned properly and not developed to follow the evolution of the world. Regardless of the adoption of a Swedish system for education, there are challenges affecting this sector. This is due to improper preparation for this adoption. In contrast, there are some individual efforts by the Ministry of higher education and scientific research in Kurdistan to send students and employees to outside region in order to study and get a postgraduate certificate under the Human Capacity Development Program (HCDP) see (www.mohe-krg.org).

Section 3.2.3.6 discussed the differences of the political process between UK and KRI. UK is one of the most liberal and democratic countries in the world which creates a good environment in order to enable citizens to feel free and participate in the political process and governmental organisations. The UK politicians cooperated with central government to make a coherent support for their local governments (Ali et al., 2009) to establish decentralised authority. However, in Kurdistan some politicians control the government services, businesses, and governmental administrations (Shareef et al., 2010b), and are a centralised administration. Thus, it will make citizens not trust in politicians and institutions and create a vast gap between government and the public. Politicians should support public bodies, civil servants and, other governmental administrations. Administration should be separated from politics, and give opportunity to civil servants to reach their potential. Therefore, government should plan a strategic policy to achieve the aims of the presumed strategy in order to establish a coherent system with support from politicians. The summary of the issues and differences between the UK and KRI is depicted in appendix E.

Due to the above differences there is a need to consider a frame of reference to include all the elements that explained above with respect to citizens' desires, along with state's objectives. The argument here is that, while the UK's e-government cannot simply be pulled up and cultivated in KRI. ICT is not the big issue, it is the entire thinking about other challenges as we mentioned above. The researcher examines various e-government stage models in the literature from (2000-2010) in section 3.1 in order to identify deficiencies, failures, and success factors of the models. Nevertheless, these models seem to vary from each other as they are based on different perspectives and use a somewhat variety of metaphors of e-government. The researcher also analysed one of the top ten implemented e-government systems in the world such as the UK in section 3.2, in order to find out the key similarities of the objectives to adopt an e-government stage model in the KRI. The researcher examined that there is no potential to copy a developed e-government stage model and adopting into KRI, due to various factors which have been discussed. But can learn lessons to enrich the proposed model. In addition, each model proposes being based on the state's objectives and public desires.

Following the analysis of conceptual e-government stage models in section 1.7, 3.1 and 3.2, it is clear that while a number of key components or elements are identified in various models. Nevertheless, there is not a single model that contains all the required elements. Furthermore, as already stated, current models failed to take into account, the challenges faced by developing countries and what follows. Therefore, there is a list of key components or elements that would be required to develop a new more appropriate model for this research.

1- Citizen-centric based approach.

2- Potential use of multi-channel delivery of services.

3- Encouragement of citizens from engaging in e-government, following interaction stage.

4- Government should create a transparent competitive environment amongst various telecommunication companies to provide supreme services to the public.

5- Automation, development, and digitization of back-office of certain institutions at the early stage.

6- A citizens' awareness campaign, to involve cooperation amongst government entities with civil society institutions, and improve citizens' knowledge (reduce the knowledge divide) of the system.

7- The development of an appropriate legal framework for e-government implementation to establish a coherent system and supported by public to success the system.

8- Create and adopt mechanisms to make citizens aware of how best utilize the new system and also develop a strategic road map to encourage stakeholders to utilize the e - system.

9- Deploy the IT literacy in education curriculums in educational establishments, and IT skills training for government, citizens, and employees in order to reduce the digital divide.

10- Effective transition between e-government development stages.

11- Discipline and rigour in managing process and public administration.

12- Non-intervention from politicians in government administration, particularly in developing countries, with no monopolising companies by politicians.

13- Government should also allocate a reasonable fiscal budget to implement e-government system

14- Training workshops for citizens involved in various stages of the development process voluntarily.

15- Cooperation between government establishments (inter and intra-establishments).

16- Involve academics, local government officers and other stakeholders' view points in the project.

17- Produce main portal with sub-portals for individual government agencies and,

18- Publishing a portal with multilingual usage of (local, national and international languages).

Chapter Four: Proposing an eGovernment stage model

A citizen-perspective strategy cannot be attained by merely putting information on the web and it being ready for citizens to access it. A citizen-centric strategy is vital to involve citizens in decision making and also encouraging stakeholders to utilise the system. E-government is a continuous process of transformation and may involve a government reform, to reach the fully integrated and e-democracy government initiative. Government authorities should take serious steps, during which all the required tools and facilities are being prepared. The result will be a step-by-step completion of the system.

In chapter 3, the researcher analysed various e-government stage models in the literature. The finding revealed various limitations and gaps in the analysed models. The findings also revealed that the UK government cannot be applied to KRI, due to the broad gap between UK and KRI in various aspects. Therefore, the proposed model aims to add all the key strength points that were identified in chapter 3, and take these into consideration for the proposed model. The tasks of the proposed model have been identified through intensive analyses of the e-governments in the literature along through the interview with ordinary citizens and government employees in certain KRG institutions. According to the citizen's requirements and government reality, with lessons learned from other e-government stage models. The six stages of the proposed model have been identified, along with consideration of the elements that have been identified throughout this research.

In order to implement any IT project there should be an administrative framework to manage the project. This chapter also outlines the organizational framework for managing e-government sectors in developing countries. Further, the chapter ends with the process of one of the significant applications in multi-channel delivery of services for e-government development such as mobile/wireless channel.

4.1 E-government stage model for regional government in developing countries

As explained at the beginning of the thesis, the research aims to propose an e-government stage model based on a citizen-centric approach along with the critical issues that were discussed in chapter 2. The model is expected to cover all the other better visions of e-governments in literature. The key difference of this model from the others is including all the elements and components that are required for an effective implementation of e-services in regional government in developing countries. The proposed model is based on both technological and public perspectives, but mainly focuses on a citizen's perspective. In each stage government plans a strategic roadmap, technical procedure, and financial and security procedures. The first concept is the road map in which e-government administrator identifies the opportunities to design a suitable path way for every change and development. The second concept is technological opportunity, which updates and installs new technology and their applications. The third concept is the security, which checks the system and builds a vigorous security system. The last concept is the financial; an e-government administrator allocates financial resources for each stage to make sufficient systems able to move forward. At the end of each stage, the process should be evaluated and tested in order to identify the validity of the business process at each stage. The most vital challenge in this model is focused mainly on two stages that are different from other e-government stage models namely; initial and an enhancement stages also modifies other stages according to the KRG objectives and state's reality. These two stages are very important which have not been considered as a priority in e-government models by most of the academic researchers. The sketch of a proposed e-government stage model is illustrated in figure 17.

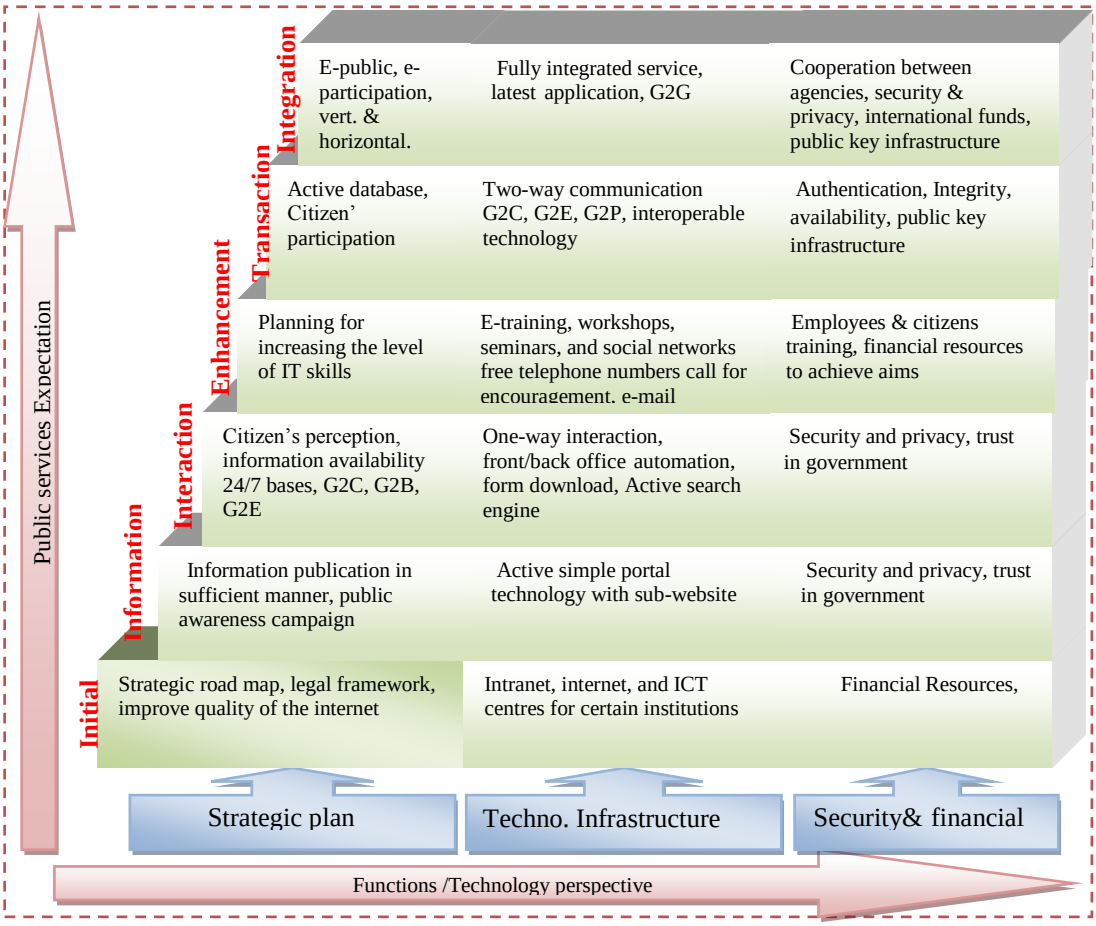

Figure 17: Six stages model for e-government

4.1.1 Initial stage

Due to a lack of ICT infrastructure, the government at this stage prepares for fundamental and basic requirements to initiate e-government sectors before providing information and e-services in order to become an accurate and efficient system. Government at this stage sets up the technical infrastructure (Gupta et al., 2008; Al-Shafi and Weerakkody, 2008) such as; a networking system, intranet, and internet, availability, and ICT centres, at least in some certain government institutions. Government attempts to draw a strategic roadmap for an e-government system for instance; infrastructure (intra-institutional network structure), legal framework, e-government administration, timescale, financial resources (budget), human infrastructure, security and the main objectives of the proposed system. Thereby, that will be shared by all government clerical staff in order to reduce the

design-reality divide (Ghalib and Heeks, 2008). The establishment of traditional multi-channel delivery of services such as; posting telephone centre, face-to-face, and others, in order to enable the entire stakeholders to benefit from government services, due to a lack of some traditional service channels in the KRI.

The government at this stage should guarantee the security of the network infrastructure, and improve the quality of the internet which is a big concern.

4.1.2 Information stage

At this stage, the government establishes a proper plan on how to provide information to its citizens seamlessly, and reasonable budget to execute this stage. Security is an important challenge which required to be established in order to secure the portal from unauthorised user. Accordingly creates an appropriate portal or website and sub-websites for certain government institutions to put sufficient information online. As a consequence, citizens are able to access the information online for instance; institution's objectives, rules, regulation, political issues, government activities, and news. To offer many governance sources and public policy, strategy, and objectives of a new system that will create a clear vision to the public. At this stage the staff should be able to manage the information on the web efficiently (Dawes, 2009), and continually update the information, that will be the significant challenge for the government at this stage. The information should be in various languages such as international, national and, local. The website management should be controlled by professionals and highly skilled IT people to be able to update the information continually. The resources should be allocated professionally, and the website should be easy to use. Government should build a constructive institutional framework for managing an e-government sector. This sector should provide, telephone numbers, postal mail and contact addresses, in order to able stakeholders to access information regarding government policy, laws and, regulation, which will lead to a transparent system. At this stage the information is not transactional.

The government should prepare and make the community aware of the system. This required a proper plan to achieve these tasks; therefore government should plan for a process on how encourage stakeholders to participate in the new system. This

process requires suitable budget and technological capability to be successful. The provision of guidance, notes and to make citizens aware of how and why to use the information online will go a long way to alleviate some of the problems and how the system will benefit them.

In the survey carried out in 2010, 91% of people surveyed put citizen awareness as a vital ingredient for success of any e-government project, as shown in figure 18. Furthermore, promotion campaigns should be organized to inform the citizens about the benefits of the e-government system. This will therefore contribute to the efforts of the regional administrations to persuade the public that the e-government initiative will improve the way services are delivered. However, lack of a solid strategic plan for e-government for KRG is not officially declared; something would have to enhance the potential for an e-government initiative.

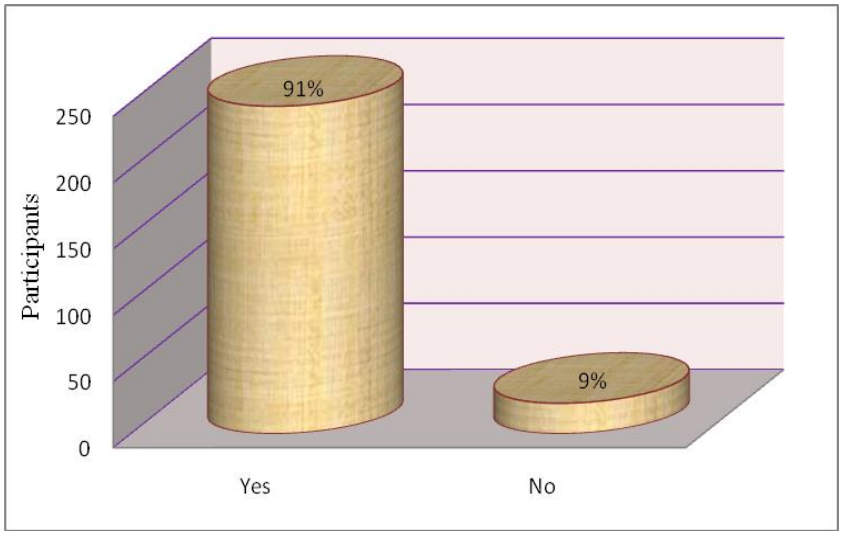

Figure 18: Citizens reflection for e-government awareness

4.1.3 Interaction stage

At this stage government plans to convince its citizens by providing suitable information and some e-services. Government interacts with the stakeholders-citizens, business, employees and intra/interdepartmental. It required particular applications and suitable budget to perform these tasks. Citizens can access and download forms such as driving licence application forms, which imply one way interaction. The government provides substantial, clear, useful and effective

information on the web, and also offers electronic mail and other multiple channels to ease and improve the interaction process with stakeholders. Such interactions will arise via dedicated telephone lines, email; SMS contact numbers, feedback forms and downloadable forms online. The correspondences or forms can then be sent back to corresponding government institutions through the various delivery channels- by post, or hand delivery, and face-to-face. Furthermore, government automate and develop back-office of a certain government agency in order to enable employees to conduct and perform consumers' transactions rapidly and efficiently. To achieve the interaction stage effectively required securing the interaction process properly, and therefore security of the process is vital to success the system. The government portal should include a section for citizens (citizen opinion) in order to enrich the information by their comments and suggestions regarding information availability and service provision. Some services could be provided through alternative multi-channel deliveries, such as providing direct contact with government employees through, telephone, e-mail and chat forums. These kinds of channels will consequently save time and cost, and may resolve some of the lack of transparency and bureaucracy culture. It may also result in reduced bribery and corruption activities which have plagued many government institutions and are a big concern to most regional governments in developing countries, whilst getting rid of waiting in long queues and paying money to get served. Government at this stage will automate and develop front/back-office of a certain government institution in order to enable employees to conduct and perform consumers' transactions rapidly and efficiently. Accomplishing this stage will impact on the trust in government and its institutions.

4.1.4 Enhancement stage

To embark an e-government system, the government should prepare and assist the community to raise their IT skills and efforts for bridging the digital divide. This required a proper plan to achieve these tasks. Therefore, government should plan for a process on how encourage stakeholders to participate in training courses to reduce the digital divide. This process requires suitable budget and technological capability along with political decision. At this stage, sufficient information and some e-

services are uploaded on the website properly. Then, the guidance and promoting citizens' awareness (Calvin et al., 2008; Coursey et al., 2007) continued at this stage. The government prepares citizens for the use of new information and services electronically. Enable provision of information regarding government such as, downloadable database, reports, policies, laws and regulation, along with some information and e-services. The government should encourage citizens to participate in e-government activities that will be a vital factor to the success of e-government process (Fitzgeral, 2005; Darrel, 2004).

In the interaction stage, the government provides the information and some services on the web, but if, on the one hand the stakeholders do not contribute in the process, the whole process will be at risk and will be useless and deemed to fail. On the other hand, participating citizens in the e-government process will cultivate citizen trust in government (Tolbert and Mossberger, 2006. The enrichment of e-government processes with training purposes (Chan et al., 2008) and by providing free telephone numbers on the website will encourage citizens to use the service. This can be achieved by publishing leaflets, advertising (Elnaghi et al., 2008; Lootah, 2005), newsletters, SMS, radio, TV, messages, magazines and using multimedia communication in various languages such as, Kurdish, Arabic and English. To make the services of more interest to citizens, by encouraging individuals to contribute to e-government improvements, and holding seminars to encourage citizens to get involved in using the system. Initiate a citizen centred approach (Sahraoui, 2005) for training in order to allow capable citizens to be familiar with the system. This is a vital issue to the success of e-government that will bring public trust in government.

This stage is vital for regional government in developing countries due to some factors that are explained in chapter 2, such as political, cultural, organizational, technological, social issues, educational level, and lack of citizens' contribution. Additionally, an e-government training course aims to increase the employees and clerk's knowledge of the fundamentals of e-government and the strategies behind it and helps to ~~also~~ reduce the digital gap. More importantly, it is very necessary to have online training for external users, motivation for media support for building IT skills. The provision of training workshops for citizens and the use of information kiosks and e-learning courses and training for workforces and citizens, will bring a great benefit and costs and time savings to the government. This is one of the

important factors at this stage, which Layne and Howard did not mention in their research. E-learning can be used in the area of e-government, creating a relationship between government and its employees (G2E), and is an effective way to provide e-learning (Ndou, 2004). This procedure is not completed at this stage but, it will continue until the government reaches its aims. Government should also promote citizens to become more actively concerned in determining the contents of the information and services on the website by taking the citizen's viewpoint into consideration. These perspectives offer vital speculations for analysing e-government implementation that reflects the government authority's nature and their accountability in citizenship (Carter and Bélanger, 2004) and impacts also in reducing corruption.

4.1.5 Transaction stage

The e-government initiatives will concentrate on processing citizens' services electronically online, from government agencies. This requires technological capability along with designated applications to perform transaction. The focus is on putting an active database link to online services, enabling adequate security and confidentiality of information in the process. Here, the citizens transact with government online by filling forms and government replies with confirmation. For example, citizens who want to renew their licence, or pay tax and fines online. The online transaction facilities can be of great benefits to citizens, especially those living further away and/or not easy to access/difficult areas, saving time, effort and costs. The fifth stage is the start up of the e-government as an innovative entity changing the way citizens communicate with their government (Layne and Lee 2001). It is also the stage at which the government initiates two-way communication with its stakeholders, through various types of relationships, such as; G2C, G2B, G2E, G2G and G2P. To achieve two-way communication effectively requires reasonable financial budget and human resources. At this stage government provides services by using advanced technology along with the developed application and consideration to the authentication, integrity, and availability of e-services.

4.1.6 Integration stage

After the widespread use of the transaction stage, the expectations and prospects of citizens will increase. Therefore, government should plan a road map on how satisfy stakeholders and integrate e-service processes. However, the integration of services requires developed technology and advanced security system along with suitable financial budget to perform these tasks. The integration process allows government institutions to provide full services to its citizens and businesses online. In this case, the user will be placed at the centre of the development and the provision of electronic public services. All institutions will cooperate in a universal e-government website or portal with interconnected sub-websites for ministries and government institutions. The services will be accessible for citizens and will be able to receive all services online through this/these websites. Apart from that, government creates opportunity channels such as kiosk, blog, twitter, Facebook, online polls, e-meeting, and others to enable citizens to state their viewpoints and opinion on the initiation of e-government implementations and the type of services desired. Hence this will lead to the transparent environment and provides equal opportunity to all citizens in the society along with social justice. The significant point which should be considered by government authorities is the cooperation between government institutions in order to speed up the efficiency of the information and e-services to the public.

Layne and Lee (2001), classified this stage into two stages; Vertical and Horizontal stages. On the vertical stage the local government/state government and the federal government system are connected for different services or functions of government. This therefore creates the interrelationship between regions and the federal government as G2G. For example; a driver's license registration system at local level might be connected to the State system for checking. The State system is then connected to a national database of licenses in the federal system. In situations where systems are collaborating vertically, an individual fills in the business licence form in a region; this information will also exist on the federal government business license system. Consequently, any crime reported and recorded on state systems can be queried and be accessible from any city or federal state. The complete benefit of

e-government will be recognised only when institutional changes have associated technology changes.

In the horizontal stage, various government institutions are connecting with various functionalities. The main feature at this stage is creating a database across different government institutions and making them communicate with each other and preferably share information. Therefore, the information provided by one institution will be propagated throughout all the government institutions. For example, when a citizen applies for a driving license after moving to another city, then he/she does not need to fill in the entire form again, because the basic residence record could be propagated to a different institutional service part of government. The majority of countries have failed to identify i.e. horizontal stage of e-government commonly across all public services in their countries (Shareef et al., 2011c).

Iraq is a federal country and requires both horizontal and vertical operations, and the researcher thinks that these two stages can be performed simultaneously; also they do not need to be presented as a separate stage. At this stage, the regional government and the federal government system are connected for different services and functions. The complete profit of e-government will be recognized merely when institutional changes are associated with citizen participation and technological changes. This stage uses developed technology with a high security of communication networks. The significant feature in this stage is the creation of the relationship between government and citizens in the political process, such as e-democracy and e-voting. Stakeholders can suitably express their suggestions and opinions to contribute in political matters through various channels in order to establish e-democracy (Siau and Long, 2005) thus it will promote transparency and accountability. Furthermore, the cooperation between the academics, local government officers and other stakeholder's view point is also another factor needed to ensure success of the system. The main challenge will be to meet the one stop services confidentiality. The eventual aim of e-government will be executed and all stakeholders of electronic government can benefit from one stop government services. Table 12 provides a summarised list of challenges encountered at each stage.

Table 12: Summarized challenges in six stages model

E-government's module stages	Challenges
Initial	Strategic plan, technological preparation; networking, internet, legal framework, network security
Information	Active website, and sector management adequately Resource allocation in sufficient way Sustainable Information updating Sufficient information to meet the citizens' requirements. Citizens awareness is essential
Interaction	Interactions, citizen perception, front/back office automation in certain agencies. Public policy provision, G2C, G2B, G2G
Enhancement	Emerging E-learning, G2C, G2E Lack of citizen knowledge, Culture attitude, Digital gap, and Privacy.
Transaction	Authentication and confidentiality Transaction between G2C, G2B, G2Eand G2P.
Integration	Interrelationship G2G, cooperation among government institutions. The integration of federal government with its local and regional governments One-stop-shopping goal, e-democracy, and e-voting

4.2 An organizational framework for managing e-government sector in regional government in developing countries.

ICT is utilised as a tool of e-government aiming to decrease the load of public administration and enhance performance in service provision to the community. Additional benefits include the expected decrease in the gap between the urban and rural area population in terms of access to service provision (Kamar and Ongo'ndo, 2007). The mission to initiate and implement e-government is inspired by policies aiming at increased accountability, efficiency, effectiveness and improved transparency; thus enhancing governance tools and practice (Grant and Chau, 2005). Figure 29 in chapter 5, shows the organisation of the ICT department at the MOP. As ICT become more integrated into the operational environment of public administration in KRI, a repetition of structures is inevitable. This section discusses the above desired qualities of governance based on literature review and proposal for a structural framework to e-government administration with the confines of a regional government structure. The benefits of these could be utilised in the KRI by reducing redundancy across ministries and public sector departments.

The proposed framework is based on Arif's (2008) IT project management model, but the focus is on e-government and its management in general rather than a specific project. In order to implement a proposed e-government stage model it is essential to derive an organizational framework of the e-government system in terms of implementation and management (Shareef et al., 2011b). The structure of the proposed framework is depicted in figure 19.

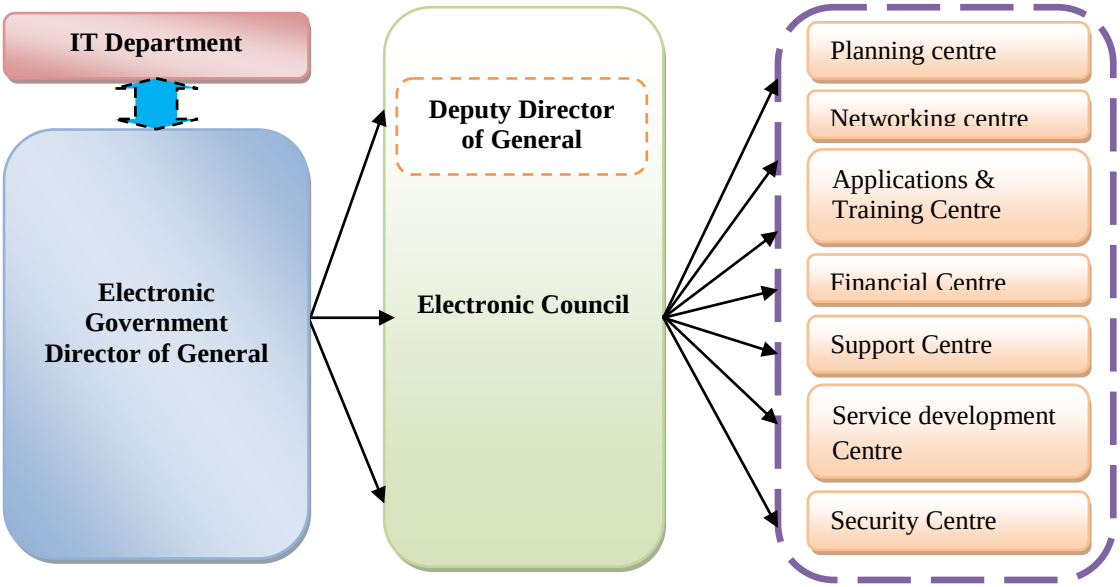

Figure 19: Structural Framework for E-government Sector

The e-government sector comprises of seven centres, all of which are managed by an electronic council, and the sector will be managed by a Director General (DG). The director general should be thoroughly knowledgeable and experienced in ICT management at a strategic level, preferably by exposure to knowledge management (Berce et al., 2008). The responsibilities of the DG will range from critically assessing employees in terms of IT competences to evaluating whether the current methods of using technology and the tools used (wireless devices, SMS, kiosks, and others) are adequate to ensure acceptance of e-government technologies amongst the citizens (Andersen and Henriksen, 2006). The Deputy Director General (DDG) will be in charge of an e-council. This will be responsible for developing the vision and direction of e-government applications and practices. Membership of this council will comprise the corporate directors of all other centres in the sector.

The main responsibilities of the proposed structure of the e-government sector can be considered as a five main responsibilities.

A. Plan, design, monitor, control, upgrade, supervises, manage, develop, support all computer networks of e-government systems and respond to any risks facing the system.

B. Systematize, recognize the technical standards, and criteria relevant to the development of e-government.

C. Train government staff and other stakeholders in order to be able to upgrade and develop the system. Also promote, and encourage citizens to utilise e-government services by raising awareness.

D. Organize all the ICT units in government institutions and ministries in order to cooperate and contribute to the development of the e-government system.

E. Financially manage, organize, and control budgets and projects for e-government implementation. The above tasks will be carried out by seven main centres in e-government sector as follows:

4.2.1 E-government Planning Centre

This centre deals with the planning and designing of the e-government system with short, medium, and long term objectives embedded in the strategic plan (Arif, 2008). Furthermore it is responsible for web design, programming, creating databases, interpreting the information into various languages such as; national and international language, in order to facilitate understanding of information and services to the stakeholders (Jaeger and Thompson, 2003).

4.2.2 Networking Centre

This centre deals with the design and maintenance of the networks across ICT centres in government entities. It is also involved with the operation of external and internal computer networks. Finally, it is responsible for wiring and installing all the peripheral equipments, also technological component maintenance such as hardware and software.

4.2.3 Computer Application and Training Centre

The centre manages the web site and the e-government system. Further responsibilities include training employees and other stakeholders in terms of ICT skills, aiming at reducing the effects of the digital divide (Ke and Wei, 2004). The centre is responsible for creating and managing citizen and stakeholder awareness programmes, aiming to enhance the relations with stakeholders; namely citizens, business, and employees (Weerakody et al., 2009; Carter and Belanger, 2005).

4.2.4. Financial Centre

The centre manages financial issues such as budget setting and its monitoring process. It is also responsible for finding and funding sources to support the projects and the day to day running of the e-government systems (Gant, 2002).

4.2.5 E-government Support Centre

It addresses the need for technical and economic support to the sector, and supports any technical principles and values for development. It also studies all the trends of the system in terms of regulatory units at government institutions in order to construct the suitable decision. This centre analyses the services in terms of coding and programming. The services will be prepared and sent to the development centre.

4.2.6 E-government Service Development Centre

This centre deals with the flow and type of services provided to the community, through gathering information and researching in order to improve and develop services. It guarantees that the information and services that are provided to the community are in a good order (Jaeger and Thompson, 2003). It is responsibility to test the flow of services, and to evaluate the various aspects of the services in terms of human resource, quality assurance and the quality of services (Nygren, 2009; Wang and Liao, 2008; DeLone and McLean, 2003).

4.2.7 Security Centre

This centre is responsible for the security of the system in general and the gateway or web site in particular. It is vital to guarantee and facilitate citizen's transactions, make citizens' information safe; secure their privacy and confidentiality of information network (Reddick and Frank, 2007). Moreover, it is responsible for protecting the system from any inter and intra hackers and theft of information. Once the service is guaranteed it will then go online. The summary of service flow is shown in figure 20.

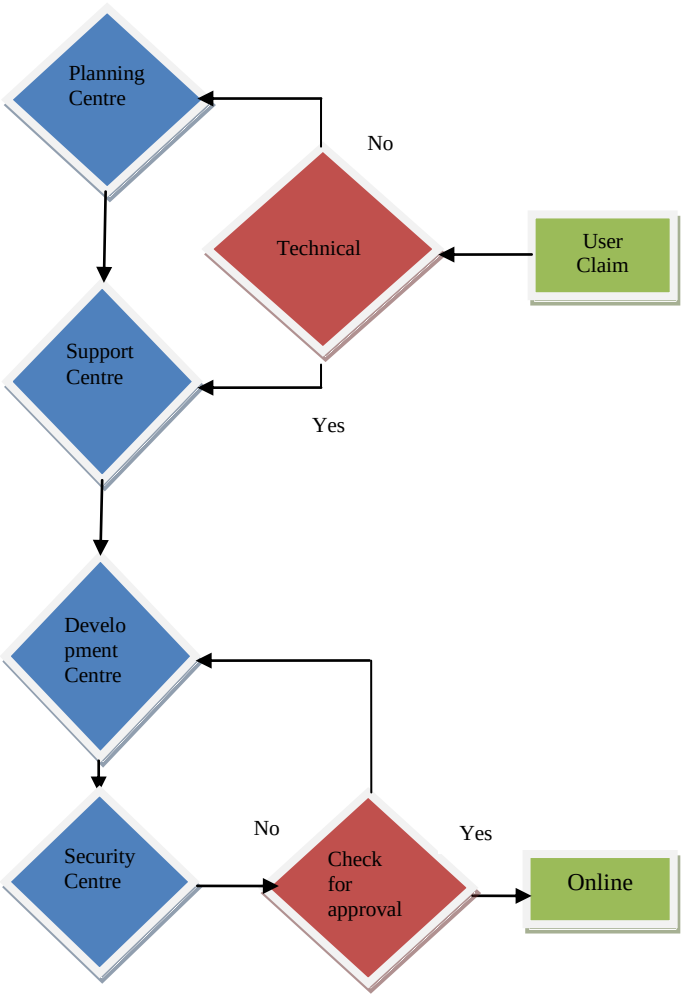

Figure 20: Service process and its maintenance

The service will be designed at the planning centre, who will then send it to the support centre in order to frame it in a suitable program and will create an

appropriate coding for the service internally by e-government sector programmers or externally by private companies. Once the service is coded, the service will be moved to the development centre in which the service will be evaluated and assessed in various aspects for approval in order to be capable of transmission. Finally, the service will sent to the final check, if the approval is attained then the service will be broadcast online, if the service has any difficulties it will be returned back to the development centre. In case a consumer/user claims for any certain services. The claim will check whether it is a technical issue or not, if not it will transmit it to the planning centre. If the service is technically sound it will transmit to the support centre.

4.3 Identity checking application

The huge number of mobile users around the world which have already exceeded the number of stakeholders in terms of internet access and massive new technologies such as UMTS, WAP, WLAN, 3G, 4G, WWAN, WiMax, and others reaching a significant number of users who provide a lot of new multimedia and data services for their mobile. Consequently, this new technologies allow for easy access anywhere anytime and more bandwidth is pressured on the national and local authorities to involve mobile government services in their agenda and plan. The omnipresent computing atmosphere is based on anywhere and anytime services provision in the context of rapid atmosphere change. In other words the user can receive any information whenever they want and wherever they are. In this case a mobile/wireless device does an important role in the omnipresent environment (Shareef et al., 2010a).

The lack of landline connectivity made the use of mobile terminals a primary use of communication. This technology gives potential to make government more effective and accessible to citizens, particularly, for areas that landline services are not sufficient (Pimenidis et al., 2009). Mobile phones are no more used only for telephoning but used for other purposes. The current efforts on mobile technology researches provides a wide range of government's overall service delivery strategy, and also offers opportunities for identification of mobile application that advance

various sectors such as, health care, education, public service, and justice. E-service delivery will be a key source of innovation.

There are many researches which have been carried out in terms of the use of mobile terminal technology; as such Guillet et al. (2008) used GPS technology for visually impaired people in an urban atmosphere in order to identify the surrounding area. Kowalik and Kwasniewski (2004) proposed and discussed a navigation device based on talk-GPS information for blind people, in which to convert the video images to voice in real time domain.

Wireless/Mobile technology usage is rapidly increasing amongst the people in Kurdistan. As a result of the rapid growing uses of mobile phones, mobile channels are essential to alert citizen about the availabilities and advantages of mobile channel implementations. Therefore, this section investigates and illustrates one of the applications of mobile channel that is useful particularly for KRI in terms of security. According to the pilot survey found that 99% of participants in Kurdistan use mobile phones, and performed various functions and services as illustrated in figure 21.

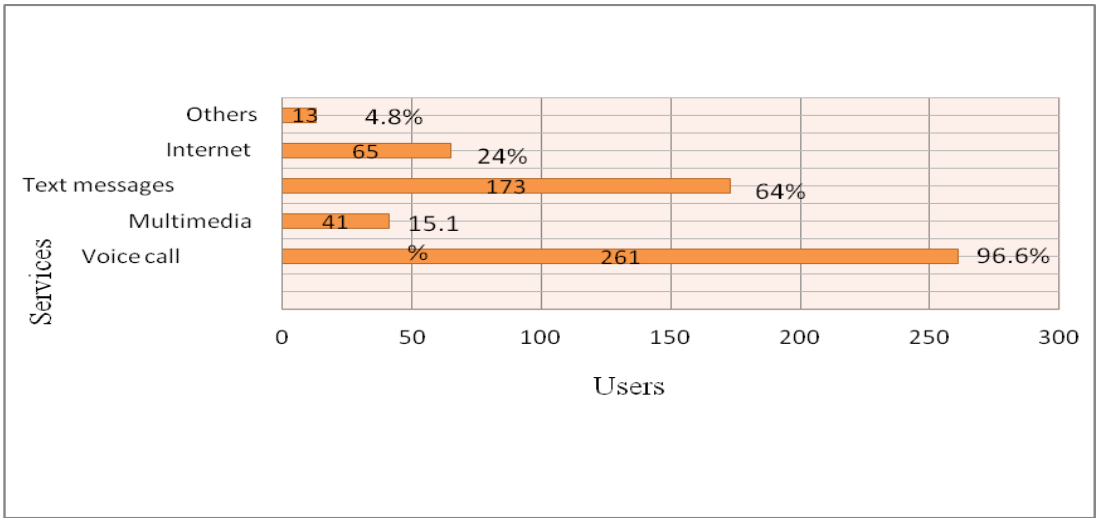

Figure 21: Type of services performed by mobile phone

Therefore, the emergence of wireless/mobile technology makes a novel opportunity for governments to bridge the digital divide, (the gap between people who has effective of the use of ICT and those with limited use or not at all) and provide service to both citizens and employees anytime, anywhere, through wireless devices (Hosny and Arreymbi, 2007; Foley 2003; Townsend, 2002).

The proposed application is to improve information access and provide up-to-date real time data that could be shared with security forces to protect the general public, and help improve the traffic information system. Therefore, it will improve and increase the use, efficiency and effectiveness of the traffic police system of information gathering and dissemination, used to identify and recognize any suspicious vehicle or terrorist threats entering the region. For the UK (ANPR, 2011) Automatic Number Plate Recognition technique is used in order to identify the owner of the vehicle and to recognize any distrustful vehicle, also to spot a vehicle that stopped in an unreliable place.

This system will protect and save citizens' lives, also making government more transparent and accountable. The infrastructure is designed for wireless communication; the wireless/mobile devices used will be equipped with latest 3G, web-enabled technologies, such as PDAs, Blackberry, iPhones, and Tablet PCs with GPS and GPRS internet access. The idea is the information concerning the vehicles and drivers' identities enters the system through the Data Recording System (DRS).

The Data Recording System (DRS) involves a database that required some elements and an entity which is called "Entities information" includes the entire details regarding driver and vehicle.

This information will be stored on a designated server. The Central Control Unit (CCU) monitors and processes the information on request. The traffic police or the police patrol can access the CCU using one of the mobile devices. This process can be achieved using various identifiers or parameters such as vehicle registration numbers or the driver's licence number. The CCU will communicate with mobile devices, to recognize its location of the patrol and report any urgent action. This communication takes place via GPRS internet access. With this application police officers can identify all the details about the driver and the vehicle in real time such as, driving license, MOT, vehicle registration, driver's identification, traffic fines and etc.

The benefit of this identification system in real time will decrease the time waiting; energy, reduce associated paperwork and also speeds up the report of suspicious events. This system is vital for today's Iraq especially from the security point of view. The architectural design of the system is shown in figure 22.

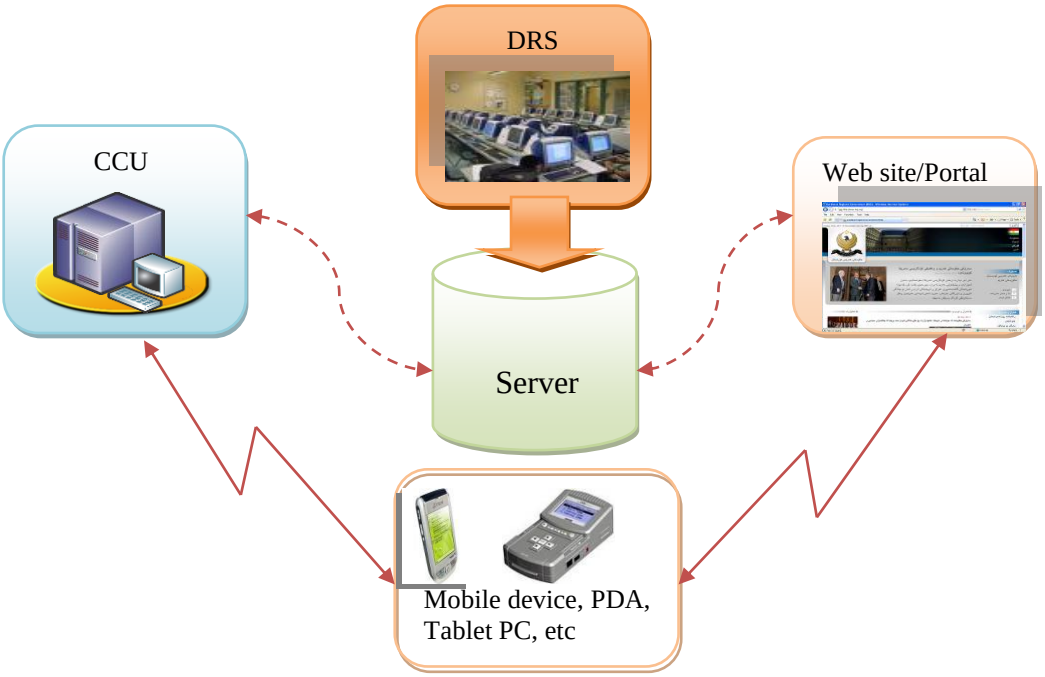

Figure 22: Conceptual view of the system architecture

To implement this application requires various strides such as database design, Wireless Access Protocol (WAP) site, which is an international standard in a wireless communication field for application-layer network communications. The idea is accessing the CCU from a PDA device or from a mobile phone. In addition, the system also can be accessed through the institution's website, by creating a direct access via entering username and password in order to enable the officer to access the database. In the context of WAP the police officer is able to access the system through its PDA or mobile phone that needs a username and password. Thus it will give an opportunity to the police officer to access the system, and then require the "Entity Identifier" such as vehicle registration number in order to get the entire information and details of the entity that discussed above.

Chapter Five: Evaluation of the proposed electronic government stage model

The utilization of e-government continues at a massive cost and pace in the public sector and a vital field of research is the evaluation of the system. The aim of this chapter is to identify appropriate methods of evaluation procedures for proposed e-government stage models. Identifying measures of the evaluation procedure are essential for the success of the process. Therefore it is important to identify a method to meet the required objectives such as cost-effective establishment, economic development, and accountability, to reduce corruption, for transparency and equal opportunities for the entire stakeholders as stated in table 10.

This chapter aims to evaluate the proposed e-government model by integrating Strength, Opportunities, Weakness, and Threats (SWOT) analysis method with Analytic Hierarchy Process (AHP). The SWOT method is used as a tool to analyse both supply and demand to achieve a systematic approach and support for a decision situation. Selecting an e-government stage model with SWOT analysis is hard, in which various qualitative facets must be taken into consideration (Kahraman et al., 2008). These types of facets are identified through interviews with experts in the KRG institutions. These factors and facets are almost unclear and linguistic instead of being of precise value. Therefore it is crucial to use AHP to describe these types of complexities in the evaluation processes. The AHP method will be applied in order to evaluate SWOT factors systematically and commensurate their intensities which also have the ability of taking these factors into consideration in a hierarchical structure. The AHP method has been broadly employed to solve multi-criteria decision making issues for instance; systems, planning selection, concept evaluation, project selection in academic research, administration field, military analysis (Coyle, 2004) and industrial practice. The next section outlines various methods used in evaluating realm in order to identify the appropriate method for this research.

5.1 Evaluation methodology

In order to evaluate the system in an accurate manner, it is essential to find out a suitable and accurate method to employ it; in regards to e-government systems the evaluation of e-government stage models has been relatively less investigated. Most studies on evaluating e-government systems have focused mainly on the individual elements or components within a model such as; planning, strategies, service provision, ICT projects, with little or no in depth of evaluation of e-government stage models as a whole. In addition, this domain has not been investigated sufficiently from the viewpoint of system acceptance (Vahidniaa et al., 2008; Ayag, 2005)**.**

In this context, there are different evaluation methods for decision makers to decide and select the best options such as: some consultants, policy makers and project managers can utilize benchmarks, the consideration of key performance indicators (KPI), consumer satisfaction surveys and other monitoring and evaluation (M&E) tools to a different way of testing the success of e-government systems (InfoDev, 2008). Monitoring and evaluation take place during the implementation of a project, which is usually used to assess and measure government progress and also guide resource allocation decisions. In addition, this method may occur in different levels be at local, national and international level. However, the researcher believes that evaluating any system particularly e-government systems in some cases prior to implementation are important, otherwise will be a waste of budget if evaluated after implementation.

Key Performance Indicator (KPI) is a method used for measuring a progress accomplishment of a partial or final objective, also used to measure progress and returns of a project (Moon et al., 2008). However benchmarking is a process in which institutions assess and evaluate some facets of their functions in regard to best practices or the best achievement in the same sector (UN, 2010). It also permits institutions to build up their plans on how to apply such best practices, if not enhance their performance, in regards to the best in the field.

The SWOT analysis method has been widely used as a tool for planning and analysing strategic actions over the past decade. This method can also be used in

identifying environmental relationships and enable an institution to relate to its environment and help to grow business strategies**.** SWOT analysis was originally explained by (Learned et al., 1969) as a key tool for tackling complex strategic issues by decreasing the quantity of information required enhancing decision making. However, Wheelan and Huger (1998) applied SWOT to determine gaps and matches between resources and the business situations in their popular business policy and strategy. Glaister and Flashaw (1999) stated that SWOT analysis is one of the best methods used in strategic planning in UK companies. Furthermore, the SWOT analysis method can also be used to evaluate the proposed framework against best practice frameworks in developing countries (Mousavi et al., 2010; Kahraman et al., 2008).

Kahraman et al. (2008) applied SWOT analysis methods for implementing e-government action plans in Turkey. Moreover, this analysis method has also been used by practitioners and marketing business, which counted as a popular method for strategic issues and business marketing, to assess alternative and complex decision issues. This method was also used by individuals such as, Ames and Runco (2005) who employed a SWOT analysis to see why certain contractors are successful. The method has been used by organizations in order to compare two firms or evaluating various companies.

Higginbottom and Hurst (2001) used SWOT analysis in the national health sector in the UK to develop a therapy quality assurance strategy. Villinger (2009) used SWOT analysis methods to analyse the strategies and mission of two non-profit organizations in the United States. Hai (2008) used SWOT analysis methods to obtain the best strategic alternatives for the Taiwanese Small and Medium Enterprises. Helms and Judy (2010) reviewed a number of literatures in the last decade of SWOT usage and classified the levels and types of applications.

Some of the researchers argue that SWOT analysis methods are oversimplified (Kay 1999). Therefore the managers and decision makers make a mistake in using this method because of the simplicity (Haberberg, 2000). However, (Baker, 2000; Piercy and Giles, 1989) proponents of the simplicity of the method, and Baker (2000) stated that the institutions can use the method efficiently and evaluate the issues based on consumer's perception.

Soft Systems Methodology (SSM) is a method that is used to evaluate systems and solves the real life issues. For example, Winklhofer (2002) used SSM to illustrate a real world case study for information analysis in order to evaluate information system throughout the organizational change. There are other methods which have been broadly used to evaluate systems or projects such as ELECTRE which stands for (Elimination and Choice Expressing Reality) and is a widely known evaluation method that can be used to assist decision-making activities which add both qualitative and quantitative criteria (Wang and Triantaphyllou, 2006; Huang and Chen, 2005). The Technique for Order Preference by Similarity to Ideal Situation (TOPSIS) method has been developed by Huang and Yoon (1981) as an alternative to (ELECTRE) for order preference by similarity to ideal solutions.

Brans et al. (1986) applied Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE) method for evaluation and have provided six generalized criteria functions for reference such as, usual criterion, quasi criterion, criterion with linear preference, level criterion, criterion with linear preference and indifference area, and Gaussian criterion. Pohekar and Ramachandran (2004) also used (PROMETHEE) method in his study on sustainability of energy planning. Pohekar and Ramachandran (2004) reviewed and analysed more than 90 published papers in order to address and find out the best method for system evaluation. They revealed that AHP followed by outranking methods PROMETHEE and ELECTRE is the best method. Zeleny (1982) used the Compromise Programming (CP) method for evaluation and Keeny and Raiffa (1976) also used Multi-attribute utility theory (MAUT).

Furthermore the Multi-objective optimization method is a broadly used method in energy planning, energy resource allocation and, electric utility applications (Lootsma et al., 1990). Decision Support System (DSS) is a system that supports computer based techniques for assisting the decisions (Turban, 1995). Multi-criteria decision making (MCDM) method also uses an approach to produce a compromise solution. It is a compromise in that the decision maker has traded-off the weights of the alternatives according to the decision maker's understanding of the issue atmosphere, experience, and even biases. These are handled by the AHP via the answers to the pair-wise comparison questions. Other decision makers with their own weights might choose another solution (Bodin and Gass, 2003).

Vahidniaa et al. (2008) applied fuzzy AHP analysis and α-cut- based method to make decision tools especially in the issues with spatial nature or GIS-based. Ayag (2005) combined a fuzzy set theory with an AHP method to evaluate a new product development process. Moreover, there is also Expert Choice software that can be used to evaluate the systems and assist managers and decision makers to select best choices based on their criteria. There is a large amount of literature dedicated to the use of AHP, which is one of the best methods which have been widely used for 32 years to tackle a wide range of multi-criteria decision issues (Bodin and Gass, 2003).

5.2 Method for the evaluation of e-government stage model

In the last decade, the development of e-government became the global shift in public sector reforms. E-government is a vital device for essential transformation of the way government provides service delivery to their citizens and other stakeholders anytime and anywhere. A large amount of research has been investigated into monitoring, evaluating and benchmarking e-government system. However, there are few researches carried out on monitoring and evaluating e-government stage models. In particular, there is very little research which has been published on evaluating e-government models using the AHP method. This will add another significant contribution to knowledge in this research. Some researchers explain the evaluation methodology as a method that can help system developers in evaluating the utility and usability of their systems. The key elements of the evaluation plan are data, users, tasks and metrics (Morse, 2002).

In addition, the main objectives of information management systems or any other complicated application is to run the system, incorporating new attributes and, assigning resources to obtain system aims in a timely manner. The availability of these resources should make the process of evaluating systems more accurate. Some scholars identified evaluation criteria as follow (Kokkinaki et al., 2005).

1- A reliable design
2- Easy and secure access
3- Trustworthy and correct content that is regularly updated
4- Emphasis on requirements and needs of potential users.
5- Usability

5.3 The fundamental concept of the Analytic Hierarchy Process

AHP is a multi-criteria decision making method that utilises hierarchical formation to show a problem and then develop priorities for alternatives based on the decision of the user (Saaty, 1980). AHP has been developed by Thomas Saaty in 1970 to assist decision makers to solve unstructured problems in social, economic, military analysis and management science (Coyle, 2004). This method is an appropriate method for complex decisions that involve the comparison of decision tools that are difficult to quantify (Saaty, 1980). Also it can be expressed as a multi-criteria decision making method to derive ratio scales from paired-wise comparisons (Saaty, 2008). Saaty fundamentally introduced 27 numerical comparison scales for comparing two items when he was developing the AHP prior to the decision to utilise 1-9 scales (Saaty, 1980). Eventually, Saaty deduced that 1-9 scale worked perfectly in its ability to cover both qualitative and quantitative information as needed by the pair-wise comparison form of the AHP. The AHP assists the decision maker to handle the critical aspects of an issue into a hierarchical structure similar to a family tree. This method not only assists the decision makers to find out the best decision, but also presents a clear justification for the choices made. AHP is applied to find out the weights of the criteria and determine the final solution weights of the choice with respect to the criteria. The main purpose of employing an AHP is to recognize the best alternative and also determine a ranking of the alternatives when all the decision criteria are considered at the same time (Saaty, 1980).

One of the main advantages of this method is the ease of use in which it deals with multiple criteria. In spite of this, this method is easier to understand and it can effectively capture both qualitative and quantitative data. AHP is considered due to it consisting of a systematic approach based on breaking the decision issues into a hierarchy of interconnected elements (Ayag, 2005). Since this method has been explored, the number and diversity of applications of employing this method have developed very fast, specifically in the information systems field. A number of University programs include AHP courses to teach their students to know how to make the best decision based on multi-criteria in their job activities particularly in the business world (Bodin and Gass, 2003).

This method is used for ranking decision alternatives and choosing the best alternatives that meets his/her requirements criteria (Taylor, 2004) by evolving a numerical score to position each decision alternatives according on how well they fit each alternative. Shahrabi et al. (2007) stated the use of AHP as a substitute of another multi-criteria technique, because of the following basis:

1- Decision making involves both quantitative and qualitative criteria

2. A greater number of criteria can be considered

3. A flexible hierarchy can be constructed based on the problem.

The main essence of the AHP method is analysing complex problems into a hierarchy with the aim at the top of the hierarchy, criteria at levels of the hierarchy and, decision alternatives at the bottom of the hierarchy. Elements at the given hierarchy level are compared pair-wise to calculate their relative favourite with respect to each of the elements at the next higher level. The AHP method calculates and totalises their eigenvectors until the composite last vector of weight comparisons of alternatives is achieved. The entries of the last weight comparisons vector reflect the importance value of each alternative with respect to the aim stated at the top of the hierarchy.

5.3.1 The calculation technique of AHP

The first step in the AHP procedure is the decomposition of a complex issue into a structure (hierarchy) with the aim criteria (Boroushaki and Malczewski, 2008) at the top of the structure. The criteria and sub-criteria allocated at levels and sub-levels of the structure, and decision alternatives or comparisons at the bottom of the structure, as depicted in figure 23.

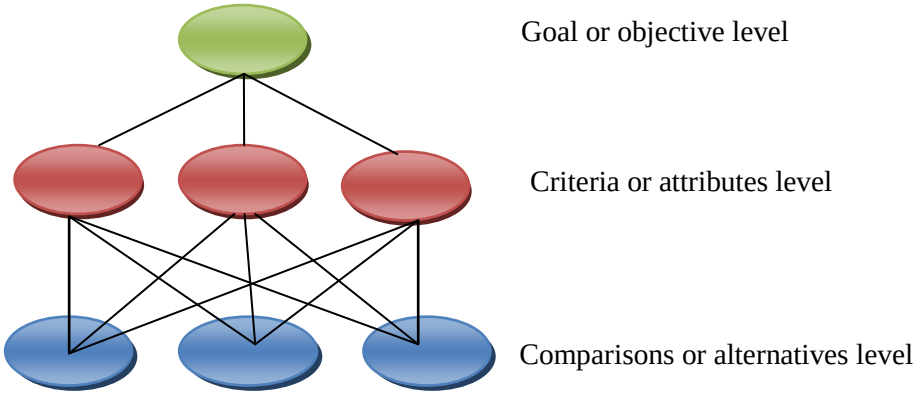

Figure 23: AHP structure (Hierarchy) of decision issue

Pair-wise comparison

Pair-wise comparisons can be explained as the procedure of comparing units in pairs to find out which one is selected. In other words, for each unit or entity of the hierarchy the entire entities which are associated with the low hierarchy are compared pair-wise. It can be observed from figure 23, that the number of comparisons or alternatives is a combination of the number of entities or elements based on that, the number of comparisons in figure 23 is three which is shown in table 13.

Table 13: Number of alternatives

No. of elements	1	2	3	4	5	6	7	n
No. of comparisons	0	1	3	6	10	15	21	$\frac{n(n-1)}{2}$

The main aim of calculation technique is to make a reciprocal matrix comparison expressing the relative values of a set of attributes. The comparisons are used to structure a matrix of pair-wise comparisons called the judgement matrix or square matrix M (Coyle, 2004). For instance, let consider n elements to be compared $D_1, D_2, ...D_n$ are indicated to the relative or priority weight of D_i with respect to D_j by a_{ij} and form a square matrix $M = (a_{ij})$ of order n with the constraints that $a_{ij} = 1/a_{ij}$, for $i \neq j$, and $a_{ii} = 1$, all i, such a matrix is said to be a reciprocal

matrix. In other words if a_{ij} is the element of row i column j, the lower diagonal is filled by employing this formula be $a_{ji} = 1/a_{ij}$ the weight of n elements. For instance if $a_{ij} = 3$ it implies that i is moderately important than j or i 3 times important than j, this is called crisp evaluation (Ramik and Korviny, 2010), and the structure of the matrix illustrated as follows:

$$M = (a_{ij}) = \begin{array}{c} \\ D_1 \\ D_2 \\ . \\ D_n \end{array} \begin{array}{c} \begin{array}{cccc} D_1 & D_2 & \ldots\ldots & D_n \end{array} \\ \begin{pmatrix} 1 & a_{12} & \ldots\ldots & a_{1n} \\ 1/a_{12} & 1 & \ldots\ldots & a_{2n} \\ . & . & \ldots\ldots & . \\ 1/a_n & 1/a_{2n} & \ldots\ldots & 1 \end{pmatrix} \end{array} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where M = comparison pair-wise reciprocal matrix.

To find out the relative selection for n elements of the hierarchy matrix, Saaty's fundamental scale of value from 1-9 is used to consider the intensity priority between two elements and, using the verbal scale associated with the 1–9 scale as shown in table 14.

Table 14: Saaty's scales for pair-wise comparison (Saaty, 2008)

Saaty's Scale value	**Priorities represented in linguistic variables**
1 2	Equal important Slight or Weak
3 4	Moderately important with one over another Moderately plus
5 6	Strongly important Strongly plus
7 8	Very strongly important Too strong
9	Extremely important

The linguistic variables and ratio scale values are used for weighting tangible and intangible elements. The values of 2, 4, 6, and 8 are selected to specify compromise values of importance.

To calculate relative weights of elements in each pair-wise comparison matrix, the Eigen value method can be employed. To compute Eigen vector or priority vector i.e. if we have a matrix three by three. We totalise each column of the matrix, then we divide each element of the matrix with the total of its column, then we normalise relative weight.

To normalise Eigen vector, row elements will be summed then divided by the number of elements in the same row, in other words taking the average value. The Eigen vector demonstrates relative weights among the objects that we compare. In this comparison method some inconsistencies may accrue and is usual. For instance when M contains inconsistencies, the estimated priorities can be achieved by employing the M matrix as the input. The relative weights (A) of matrix M are obtained from the following equation:

$$(M - \lambda_{\max} I)q = 0 \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where M is the reciprocal matrix?

$\lambda_{\max}$ Is the biggest Eagan value of a matrix?

q is its correct Eigen value, and

I is the unit matrix of size n.

The Eigen value $(\lambda_{\max})$ can be obtained by summing of products between each element of Eigen vector multiplied by the total of columns of the reciprocal matrix. Every Eigen value is scaled to total up to one to get the priorities. In other words the sum of all elements in Eigen value (priority value) is one. Inconsistency may occur when $\lambda_{\max}$ moved away from n this is because of the inconsistency responses in pair-wise comparisons. Saaty (1977**)** proved that the biggest Eigen value is equal to the number of comparisons $(\lambda_{\max} = n)$. Therefore, the matrix M should be examined for consistency by using consistency index CI as illustrated in equation 3.

$$CI = \frac{(\lambda_{\max} - n)}{(n-1)} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

One of the critical steps of AHP method is to create the comparison matrixes. However, when the number of alternatives increases, more comparisons between alternatives are required. This might easily cause the excess of the consistency of the model. Therefore, a consistency check is required for the pair-wise comparison matrix (Saaty, 1992).

The consistency index is used in order to check whether the judgment of decision makers is consistent with respect to a comparison matrix. In other words, this index is important for the decision maker to assure him that his/her judgments were consistent and that the final decision is made well. While CI depends on n, then should calculate consistency ratio CR as shown in equation 4:

$$CR = \frac{CI}{RI} \quad \text{.....} \quad (4)$$

Saaty proposed that CI used to compare with the appropriate consistency index which is called Random consistency index (RI). In other words, he randomly generated reciprocal matrix in order to find random consistency index to observe if it is about 0.1 or 10% or less. The random CI is illustrated in table 15.

Table 15: Random Consistency index (Saaty and Forman, 1993)

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

The matrix will be consistence and acceptable if consistency ration is less than 0.1 or $(CR \leq 0.1)$, if not we have to revise the subjective judgement.

In order to obtain the overall rating for the alternatives as depicted in equation 5: (Vahindina et al., 2008).

$$A_i^s = \sum^{j=k} a_{ij}^s a_j^e , \quad i = 1,\text{.....},n \quad \text{.....} \quad (5)$$

Where A_i^s = total weight of site i,

a_{ij}^s = weight of alternative (site) i associated to criterion map j,

a_j^e = weight of criteria j,

k = number of criteria,

i = number of alternative

5.4 SWOT-AHP analysis methods for evaluation

The SWOT analysis method has been widely used in various aspects for evaluation as explained in section 5.2. In this section, the researcher analysis the proposed

model based on view points of the advisors, director of general, and directors of some of the KRG's ministries which are explained in section 5.6. This analysis carried out by using SWOT analysis methods, and then evaluates the model using AHP. The idea of using the AHP method is to systematically evaluate SWOT's criteria or factors and to find out the probability of the success of the model. This SWOT analysis scans both the demand and supply side. Regardless of these advantages of SWOT, the use of traditional SWOT analysis has no meaning of forming the significance of each SWOT factor (Shinno et al., 2006). It will be hard to evaluate the most impacting factors in the decision making process. Hence SWOT analysis method alone cannot perform an accurate decision. In this research, AHP and their Eigen value calculation is integrated with SWOT analysis. Using the AHP method will offer a quantitative measure of significance of each factor in decision making. The structure of conducting these integration methods is addressed in the four steps below (Wickramasinghe and Takano, 2009):

Step 1: SWOT analysis is conducted:

The researcher proposed an e-government stage model in chapter 4. In this section, the SWOT analysis method of the proposed e-government stage model will be addressed of the sake of the evaluation procedure. This method includes systematic thoughts and inclusive identification of factors relating to a new technology, management or planning and products (Kahraman et al., 2008).
Figure 24 illustrates the SWOT analysis which identifies the factors of Strengths, Weaknesses, Opportunities and Threats of the proposed e-government stage model. These factors have been identified by IT experts in the KRG institutions.

Strengths *What strengths are able to achieve objectives*	**Opportunities** *What opportunities are able to employ*
1-**S1**: Citizen-centric based approach in terms of participation (Stage 2-6) 2-**S2**: Front/back office automation for certain institutions at the early stage (stage 3). 3-**S3**: Efficient management procedures (Stage 1-6). 4-**S4**: Public awareness campaign to aspiration of enabling and encouraging citizen to participate (stage 2 &4) 5-**S5**: Usability of multi-channel for delivery of services (stage1&2). 6-**S6**: Availability of main portal with sub-portals and along with multi-lingual (stage 4)	1- **O1**: ICT infrastructure and enhance quality of internet (stage1). 1- **O2**: Cost effectiveness in distributing information and collaboration amongst various government institutions (stage 2-6). 3- **O3**: The development of an appropriate legal framework for e-government implementation (stage1&3). 4-**O4**: Participation of academics and private company in developing of software applications (stage1-6). 5- **O5**: Role of IT academy in training public and deploy the IT literacy in educational institutions (stage 4). 6-**O6**: Funding support by external (international) institutions (stage 1&2).
Weaknesses *What weaknesses required to deal with it*	**Threats** *What threats required to be aware of*
1- **W1**: Lack of support from top levels of administration authorities. 2-**W2**: Lack of IT skills among stakeholders 3-**W3**: Lack of collaboration amongst institutions. 4- **W4**: Disparity between planned government's authority and public's demands. 5-**W5**: Extensive procedure which necessitates various iterations.	1- **T1:** Intervention from politicians in government administrations, and monopolising companies by politicians. 2- **T2**: Call for change individual's attitudes and social cultures. 3-**T3**: Division between government and citizens. 4-**T4**: Decentralised internet governance. 5-**T5**: Securing personal information privacy and their confidentiality.

Figure 24: SWOT analysis methods for proposed e-government model

Step2. The AHP method is combined with SWOT analysis:

The hierarchical structure of the evaluation process is achieved at this step which is illustrated in figure 25. The upper level represents the Aim (A) which is the evaluation of the proposed e-government stage model for regional government in developing countries. The level below the upper level (second level) represents the significant objectives (SO) of the proposed model such as; (SO1) Cost-effective establishment, (SO2) Transparency and accountability to reduce corruption and provide equal opportunity of the entire stakeholders, and (SO3) Economic development. The lowest (third) level represents the SWOT factors assigned to each SWOT group.

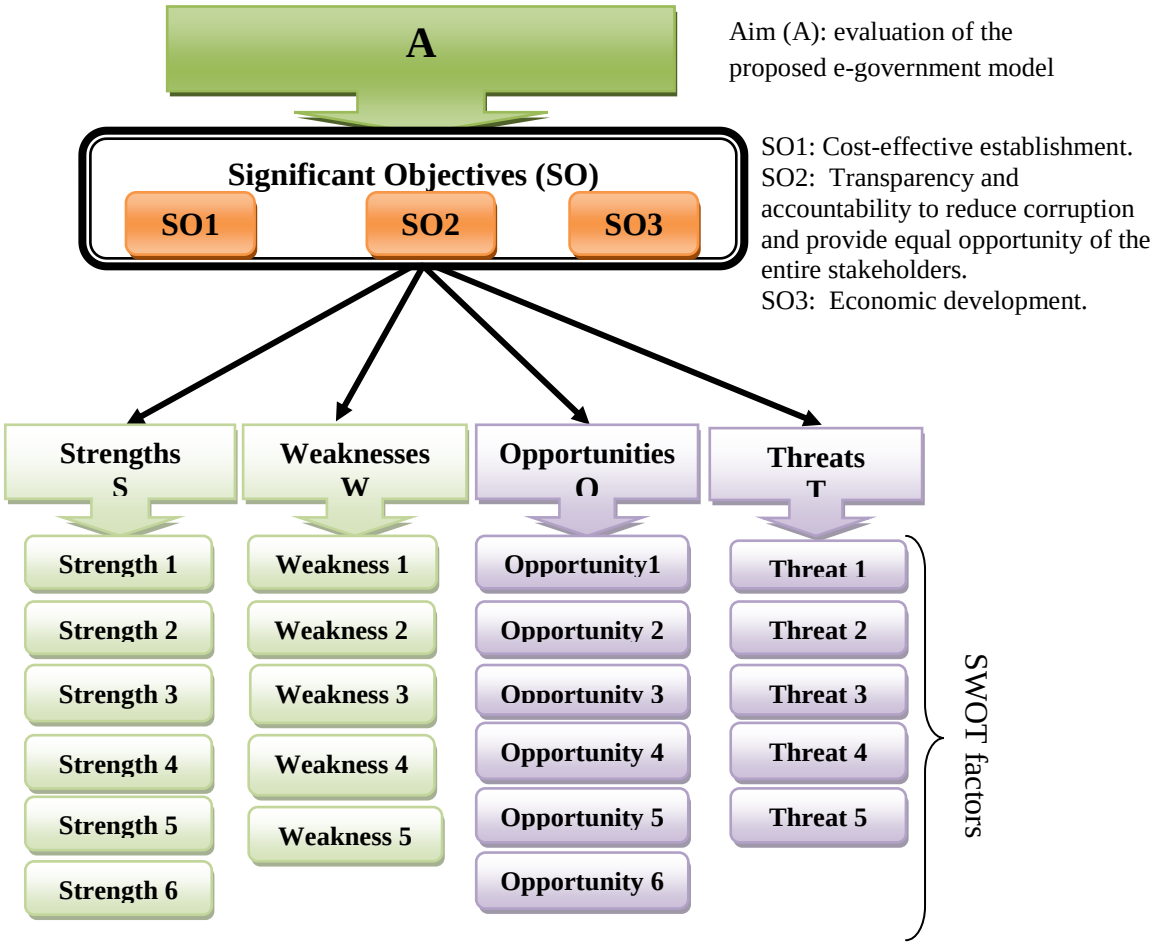

Figure 25: Hierarchical structure of the e-government stage model e-government stage model

It is useful to consider many factors; the number of pair-wise comparisons in AHP rises exponentially with the number of factors. Hence, the current process led six factors of strengths, five weaknesses, six opportunities, and five threats factors, but in this case only four factors of each SWOT group will be used from figure 25. It is essential to note according to (Saaty, 1986) the number of factors in the analysis categories should not exceed 10 factors under each SWOT group and this is the main shortage of the AHP. However, this made the user to avoid overlapping and carelessness when building the SWOT matrix.

In level one there will be one comparison matrix which communicates to pair-wise comparisons between significant objectives which has been explained in section 3.2 with respect to aim of the evaluation (Boroushaki and Malczewski, 2008). The

comparison matrix of the first has the size of 3 by 3, to identify the most significant objective. The next level pair wise comparisons between SWOT factors are performed within each individual SWOT group with respect to the objectives, and identifies priority value. To make the comparisons based on the Saaty's scale to consider the intensity priority between two elements and, using the verbal scale associated with the 1–9 scale as illustrated in table 14. In addition, it has the ability to cover both qualitative and quantitative information as required by the pair-wise comparison form of the AHP. With these comparisons as the input, the local priorities of the factors are computed by an Eigen value method. These priorities imitate the decision makers' view point of the relevant importance of the factors. The next level's pair wise comparisons conducted to select the highest value factor within the group. Consequently, the comparison matrix of the first and second levels comprises on the sizes of 3 by 3 and 4 by 4 respectively.

Regarding the first level, the pair-wise comparison consists of a matrix with size of 3 by 3, as shown in table 16.

Table 16: Pair wise comparison of the three objective criteria

Criteria/Factors	SO1	SO2	SO3
SO1	1	3	2
SO2	1/3	1	2
SO3	1/2	1/2	1
Total	1.83	4.5	5

Then, to calculate the Eigen vector of the objectives, dividing each element of the row by the sum of each column of the matrix to obtain an Eigen vector as shown in table 17.

Table 17: Pair wise comparison of the three objectives criteria

Criteria/Factors	SO1	SO2	SO3
SO1	1/1.83	3/(4.5)	2/5
SO2	(1/3)/1.83	1/(4.5)	2/5
SO3	(1/2)/1.83	(1/2) /(4.5)	1/5
Total	1	1	1

To normalise the Eigen vectors, averaging the value of the factors across the new rows, in other words add each new row and divide by the number of factors, which is

three in this case. Pair-wise comparison matrix for objectives with respect to the aim is depicted in table 18.

Table 18: Pair wise comparison of the three objective criteria

Criteria/Factors	SO1	SO2	SO3	Local Priority of the objectives
SO1	0.546448	0.666667	0.4	**0.537704918**
SO2	0.180328	0.222222	0.4	0.267516697
SO3	0.273224	0.111111	0.2	0.194778385
Total	1	1	1	1

Likewise, the same procedure will be followed for the second level which is the SWOT factor comparable to the SWOT group, which is illustrated table 19.

Table 19: Priority factors within the SWOT group

Criteria/Factors	Strengths (S)	Weaknesses (W)	Opportunities (O)	Threats (T)	Local Priority within the group
Strengths (S)	1	3	2	5	**0.272131592**
Weaknesses (W)	1/3	1	3	1/3	0.164200259
Opportunities (O)	3	7	1	9	0.478250481
Threats (T)	1/2	3	1/9	1	0.085417668
Total	4.53	14	6.11	15.33	1

Step3. Pair-wise comparisons conducted with respect to three objectives and four SWOT groups:

The three significant objectives (SO1, SO2, and SO3) were subjected to pair-wise comparison at the second level and will be calculated. The SWOT group (strengths, weaknesses, opportunities, and threats) was rated using objective criteria with respect to five intensity ratings which is shown in table 14, equally important, moderately important, strongly important, very strongly important and extremely important. The researcher calculates the SWOT factors with respect to each objective. Tables 20, 21, and 22 shows the calculations of SWOT group with respect to all three significant objectives (SO1, SO2, and SO3).

Table 20: Pair wise comparison of the SWOT group with respect to SO1

Criteria/Factors	S	W	O	T	Priority within the group
S	1	3	5	7	**0.500378888**
W	1/3	1	1/5	1/3	0.064468662
O	1/5	5	1	7	0.325860083
T	1/7	1/5	1/7	1	0.109292367
Total	1.67	9.2	6.34	15.33	1

Table 20 shows the calculation of SWOT factors with respect to a first significant objective (SO1). It can be seen that the strength factors have the highest priority with respect to the first objective.

Table 21: Pair wise comparison of the SWOT group with respect to SO2

Criteria/Factors	S	W	O	T	Priority within the group
S	1	1/3	1/5	5	**0.462701316**
W	3	1	7	5	0.128056097
O	5	1/7	1	5	0.345701433
T	1/5	1/5	1/5	1	0.063541154
Total	9.2	1.67	8.4	16	1

Table 21 shows the calculation of SWOT factors with respect to a second significant objective (SO2). It can be seen that the strength factors have the highest priority with respect to the second objective.

Table 22: Pair wise comparison of the SWOT group with respect to SO3

Criteria/Factors	S	W	O	T	Priority within the group
S	1	5	9	3	0.308
W	1/5	1	3/3	3	**0.477**
O	1/9	3	1	3	0.134
T	1/3	1/3	1/3	1	0.081
Total	1.64	9.33	10.66	10	1

Table 22 shows the calculation of SWOT factors with respect to a third significant objective (SO3). In this case weakness factors have the highest priority with respect to the third objective.

Similarly, level three of the hierarchical structure of the evaluation process will be achieved. The pair-wise comparisons of factors within the four SWOT factors (Strengths) are conducted as shown in table 23.

Table 23: Priority of factor of the strengths in SWOT group

Criteria/Factors	S1	S2	S3	S4	Priority of the factor
S1	1	3	2	5	**0.558**
S2	1/3	1	3	1/3	0.2630
S3	3	7	1	9	0.1218
S4	½	3	1/9	1	0.0564
Total	4.53	14	6.11	15.33	1

In table 23 it can be seen that first strength (S1) components or factor of the model have the highest priority which is "Citizen-centric based approach".

Next calculate the priority factor for all of the weaknesses, opportunities and threats, similar to the first level and shown in table 24, 25, and 26. In addition, to obtain a consistency index and consistency ratio, equation 3 and 4 will be used as shown below:

λ_{max} =(0.558)(4.53)+(0.2630)(14)+(0.1218)(6.11)+(0.0564)(15.33)

λ_{max} = 4.164

$$CI = \frac{(\lambda_{max} - n)}{(n-1)} = \frac{4.164 - 4}{3} = 0.054913$$

According to table 15, random consistency index (RI) is 0.9

$$CR = \frac{CI}{RI} = \frac{0.054913}{0.9} = 0.0610$$

Table 24: Priority factor or local weight of the Weaknesses in SWOT group

Criteria/Factors	W1	W2	W3	W4	Priority of the factor
W1	1	1/3	3	5	0.056463055
W2	3	1	3	3	0.121822324
W3	1/7	1/5	1	3	0.263099688
W4	1/5	1/3	1/9	1	**0.558614933**
Total	4.34	1.83	7.11	12	1

In table 24 it can be observed that the fourth weakness (W4) has the highest priority of the proposed model which is the "Disparity between planned government's authority and public's demands". This factor should be considered in the implementation process of the model in order to be a successful system.

Table 25: Priority factor or local weight of the Opportunities in SWOT group

Criteria/Factors	O1	O2	O3	O4	Priority of the factor
O1	1	5	9	5	**0.623665**
O2	1/5	1	7	1	0.189733
O3	1/9	1/7	1	1/3	0.046869
O4	1/5	1	3	1	0.139733
Total	1.51	7.14	20	7.33	1

In table 25, it can be viewed that the first opportunity (O1) has the highest priority value amongst others which is "ICT infrastructure and enhanced quality of internet". These components or factors of the model have the main potential to be enhanced due to the availability of ICT infrastructure; however it needs more improvements and provides better services to the citizen.

Table 26: Priority factor or local weight of the Threats in SWOT group

Criteria/Factors	T1	T2	T3	T4	Priority of the factor
T1	1	3	5	5	**0.543596**
T2	1/3	1	3	3	0.244222
T3	1/5	1/3	1	1/3	0.076281
T4	1/5	1/3	3	1	0.135901
Total	1.73	4.66	12	9.33	1

In table 26, it can be seen that the first threat (T1) has the highest risk in the proposed model which is the "Intervention from politicians in government administrations, and monopolising companies by politicians". This factor needs to be considered strongly in order to separate politicians from administration and avoid politicians occupying and monopolising strategic projects and companies in order to bridge the gap between government and citizen, hence it will influence the trust in government.

In regards to the four SWOT groups, the factor with the highest priority value is selected from SWOT groups to represent the group. These four factors are then compared and their relative priorities are calculated like in step 2. These are the priority vector of the four SWOT groups and they are employed to calculate the global or overall priorities of the independent factors within them. This is performed by multiplying the local priorities objectives that mentioned in step 2, by the value of

the corresponding priority values of the SWOT group. The sum of all global priorities becomes one, which will be explained more in depth in the next section.

Step4. The results are employed in the evaluation process.

In this step the aim of the evaluation of the proposed model process comes with the numerical values of the factors. New aims may be set, priorities defined and such implementations planned as to take into account the primary factors. These calculations have been carried out using Excel program and also can be done by "Expert Choice software".

In addition, the overall or global priorities of objectives and SWOT groups will be performed by multiplying the priority of the factors by the value of the corresponding priority factor of the SWOT group as shown in table 27. The same calculation procedure will be applied to all of the other factors such as strengths weaknesses, opportunities and threats with their consistency index and consistency ratio.

Table 27: The overall priority of the SWOT factors with respect to objectives

Objective criteria	Local Priority of the objectives	SWOT factors	Consistency ration % (CR)	Priority of the factor within SWOT	Global priority of the factors
SO1	0.537704918	**Strengths** Weaknesses Opportunities Threats	4.259	0.500 0.064 0.325 0.109	**0.270** 0.035 0.175 0.059
$\lambda_{max} = 4.114$ CI=0.0383					
SO2	0.267516697	**Strengths** Weaknesses Opportunities Threats	4.621	0.463 0.128 0.346 0.063	**0.124** 0.034 0.092 0.017
$\lambda_{max} = 4.124$ CI= 0.0415					
SO3	0.194778385	**Strengths** Weaknesses Opportunities Threats	7.485	0.308 0.477 0.134 0.081	**0.463** 0.116 0.337 0.082
$\lambda_{max} = 4.202$ CI=0.063					

In table 27, it can be deduced that the strengths of the SWOT group have the highest priority with respect to all the objectives. All three consistency ratios (CR) are less than 10% that will imply the calculation execution is correct. In other words, the judgment of decision maker is consistent with respect to a comparison matrix. Table 28 shows, the overall priorities of the SWOT factors with respect to each factor of the SWOT along with its consistency ratio.

Table 28: The priority weights of the categorised factors within their global priority values of SWOT factors

SWOT groups	Local priority of SWOT	SWOT factors	Consistency ration (CR) %	Priority of the factor within the group	Global or overall priority of the factor
Strengths (s)	0.272	**S1**: S2: S3: S4.	6.10	**0.558 (1)** 0.263 (2) 0.121 (3) 0.056 (4)	**0.152** 0.071 0.033 0.015
		$\lambda_{max} = 4.164$		CI=0.0549	
Weaknesses (W)	0.164	W1: W2: W3: **W4**:	6.10	0.056 (4) 0.121 (3) 0.263 (2) **0.558 (1)**	0.009 0.020 0.043 **0.091**
		$\lambda_{max} = 4.164$		CI= 0.0549	
Opportunities (O)	0.478	**O1**: O2: O3: O4:	9.55	**0.623 (1)** 0.189 (2) 0.046 (4) 0.139 (3)	**0.298** 0.090 0.022 0.066
		$\lambda_{max} = 4.258$		CI= 0.0860	
Threats (T)	0.085	**T1**: T2: T3: T4:	9.69	**0.543 (1)** 0.244 (2) 0.076 (4) 0.135 (3)	**0.046** 0.020 0.006 0.011
		$\lambda_{max} = 4.261$		CI=0.0872	

5.5 Discussion and analysis

In this chapter a common significant tool such as SWOT analysis method is used concerning evaluating e-government stage models. A SWOT analysis is in general used as a planning tool, but it has some shortages. The chapter aims to show an

application where some of these shortages can be defeated, and thus SWOT can be employed more successfully. This will be achieved by integrating SWOT with a decision analysis method such as AHP. The result of AHP will produce the quantitative values of the SWOT factors. The AHP method provides quantitative priorities to be used in decision support. The integration of SWOT with AHP creates analytically determined priorities for the factors involved in SWOT analysis and makes them commensurable. The goal in applying this integration is to enhance the quantitative information basis of evaluation of the e-government stage model. Numerical results, the priorities of SWOT criteria are of use when formulating or choosing a model.

From figure 27, it can be seen that the values of both strength and opportunity factors are higher than both weaknesses and threats in which their data are shown in table 28. It can also be observed that strengths are the most important factors of the e-government stage model with respect to both significant objective one and three (SO1&SO3) cost-effective establishment and economic development. In addition, it can be seen that the opportunity factors to be able to be employed and are also important to the proposed e-government stage model with respect to the entire significant objectives (SO1, SO2, and SO3). On the other hand, the weaknesses and threat factors are low with respect to the first and second significant objectives (SO1 and SO2). The threat factors that are required to be taken into consideration are also low in comparison to the opportunity and strength factors. Hence, the overall result shows the feasibility of the proposed stage model for implementation.

Figure 26: The output of pair-wise comparison of global SWOT factors with respect to the objectives.

Furthermore, from figure 27, it can be seen the overall value of the SWOT factors, in which the opportunities factors have the highest value (0.298) among SWOT factors and then strength factors (0.152) with less value of weaknesses and threats in comparison to strengths and opportunities.

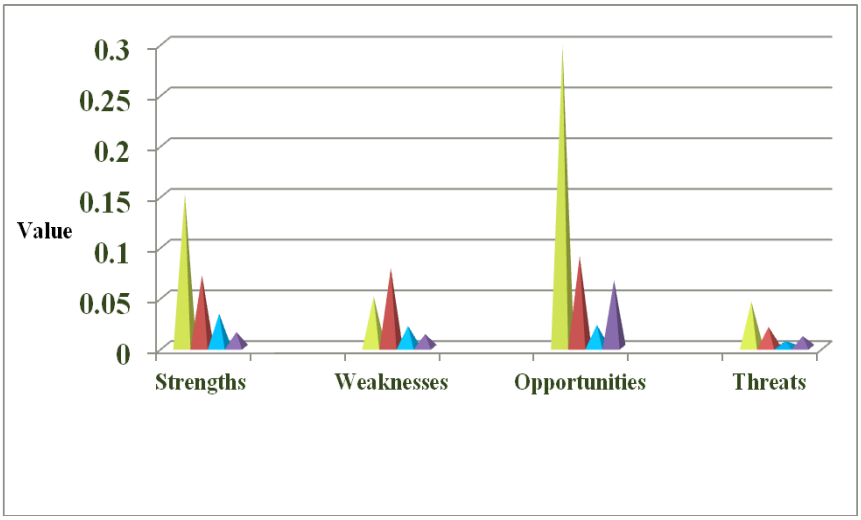

Figure 27: The overall value of the SWOT factors

However, in figure 27, it can be seen that the high value of the opportunities and strength factors are predominate and also shows that there are no huge threats or

weaknesses that could influence the failure of e-government stage model for implementation in comparison to strengths and opportunities.

Therefore the researcher deduced that the proposed e-government stage model has a high probability of the success in its implementation. This research also revealed that the results of the integration of both SWOT and AHP decision support were promising for implementation. Forming pair-wise comparisons empowers the decision maker to think over the weights of the criterion or factors and to analyse the circumstances more accurately and in more concentration. Experts participation facilitated in identifying some limitation might occur during implementation. These advantages and limitations have been analysed by utilising SWOT analysis methods with conjunction of AHP to produce a quantitative result. The next section will tackle some expert's perspectives regarding the proposed model, and then to proceed with matching both experts and the practical evaluation will take place. The overall result will provide accurate consequences and benefits the implementation process.

5.6 Validation of the proposed model via empirical data analysis

As explained in chapter 3, there is a lack of a common model for e-government implementation for regional governments in developing countries. Therefore, the researcher proposed an e-government stage model in chapter 4, to fill in the gaps in the existing models and added new ideas to the body of knowledge and considered regions' objectives. In order to test and evaluate the validity of the proposed model, which are also the aims of this research. The following sections evaluate and test the proposed model to explore the validity of the proposed model. The researcher analyses the implemented ICT projects in the KRG institutions using qualitative research methods. To accomplish this, the researcher presents six different IT projects from three different case study ministries at the KRG. Each case study will be measured against stages of the proposed model. Each case study will be measured against the elements and parameters that characterise the border of each stage of the proposed model. In addition, every case study builds upon the data which was collected from published reports, information on their websites, and interviewees view points. These analyses are used to test and evaluate the claim that something has added to the knowledge and to justify the feasibility of the proposed e-

government stage model. However, this analysis portrays two key facets of this study such as; technological and institutional aspects of the implementation process of e-government. Technological aspects include the availability of network infrastructure, computing hardware/software, applications and relevant issues. The organisational aspects include institutions readiness for e-government, IT training, public awareness, social, and political issues. In order to investigate the adoption procedure of e-government, the researcher has interviewed different Director of General (DG), managers, directors, experts, and senior employees. Two main projects in the field of IT will be analysed such as; communication networks and institutions website. These IT projected selected from three main government institutions such as; Ministry of Transportation and Communication (MOTAC), Ministry of Higher Education and Scientific Research (MHE), and Ministry of Planning (MOP). The selection of these institutions is based on three main criteria such as ICT infrastructure (Heeks, 2008; Gupta et al., 2008), level of communication (G2G, G2C, and G2B) (Lee, 2010b), and stages of the proposed e-government model (e.g. stage 1, to stage 6). The researcher selected these cases due to the launch of initial services electronically and hence providing ample information for this research, along with their important position in the KRG. In the next section, the researcher attempts to outline the strategy of e-government in terms of IT projects that have been implemented in the KRG.

The researcher also analyses each case study separately, due to the cultural and content divergence of each case study. The findings of these case study analyses will justify the validity of the proposed e-government stage model.

5.7 An overview of E-government in the KRI

As described in chapter 2, the Kurdistan region of Iraq is a federal region with a population of around 5 million inhabitants. It has attained a high level of technology, social and economic compared to the rest of Iraq. Telecommunication, health service, road, public service, banking systems and modern education system are identified as being the best in Iraq particularly in the security issue (Schorn, 2009).

In 2009 the former Prime Minister “Nechirvan Barzani” of the fifth government cabinet launched IT academy to be an initial pace towards e-government to train

government employees and citizen to improve their skills in IT and develop human resources of the region. The former Prime Minister stated that "*We must embrace new approaches to transform the Kurdistan Region, its people, civil society, private sector and government in the 21st century. The road ahead carries opportunities and challenges, so we must embrace new thinking and allow ICT to help us seize the opportunities and overcome our challenges, for the good of our people. Recognizing its importance to our present and future and its integration into our way of life will spearhead our competitive partnership in the global community"* (see www.krg.org). Recent efforts were carried out in terms of politics and public service reform under the new government cabinet to develop and improve the quality of services and transparency of information flow. These improvements faced various challenges and obstacles by various politicians due to sensitivity of their role and position. The researcher believes that this process requires more effort and takes more time to reach its aims.

Accordingly an interview was carried out with the public relation officer at the IT department at the council of ministries. It stated that these aims and aspirations encouraged the Kurdistan government to focus and attempts to pave the way towards a strategic plan for initiating e-government; the detail of this strategy has been explained in chapter 2. Apart from these efforts by IT department there are efforts accomplished by other institutions such as the ministry of transportation and communication (MOTAC). It implements two main projects to facilitate e-government implementation. However, there is no adequate effort for collaboration and coordination between these two entities to establish a single strategic model for e-government. This is one of the significant drawbacks which have been identified through the research on e-government in KRG's strategy. Unavailability of a single executive ministry to manage, organise, and pave the way towards e-government implementation will affect negatively on the effectiveness of the project. The findings revealed that each individual ministry or directorate has its own implementation procedure for e-government with a lack of a unified strategic plan and legal framework and this will impact negatively the integration system across the country (Christina and Scharf, 2008). This might also cause a conflict between various applications and systems when they approach the integrated single e-government website (Ferro and Sorrentino, 2010).

The IT department is attempting to design a strategic plan for e-government implementation but faces financial issues according to the interviewee's perceptions. The proposed IT strategy identifies the framework for e-government implementation in KRI and highlights the implementation process for e-government. The strategy proposes a technical and an institutional solution to a defined set of business and required information. However, the researcher found through interviews with some interviewees in the KRG ministries merely 1/3 of interviewers mentioned the fact that the proposed strategy has been discussed in detail with other government bodies. Therefore the researcher believes this is due to lack of cooperation and coordination between government institutions. Most of the projects might be at risk and hence fail (Heeks, 2006), because cooperation will provide an opportunity to identify the IT institution requirements or to illustrate any problems or obstacles which might occur during implementation of the strategy. In addition the cooperation between government institutions will enhance the validity of the proposed strategy and minimise redundancy and duplication (World Bank, 2009; OECD, 2003). On the other hand the proposed strategy did not consider academics, and stakeholder's perspective, and it has not yet been approved or enacted by KRI's parliament and government cabinet office for implementation, due to high budget requirements. The high financial resource is one of the significant hurdles that face the e-government implementation (Rose and Grant, 2010). Despite this the KRG has 17% of the Iraqi annual budget, and still cannot support strategic projects such as e-government. The research findings revealed this is due to lack of proper strategic plan and the political system. In addition there is a lack of willingness towards e-government implementation among some policy makers and top managers due to lack of knowledge about e-government.

In identifying the e-government measure for each country, the UN has considered demographic statistics and issues such as internet, mobile and PC penetration, human resource, level of education, ICT infrastructure, and level of government online interaction. The UN also considered various government institutions to recognize their ICT infrastructure, degree of online presence and level of traditional transaction. In this research three government institutions are identified and analysed; namely MOP, MOTAC, and MHE. In the following section the researcher analyses their IT projects, with respect to the level of communications, operations,

and scale of online services offered to stakeholders. The result of the analysis of interviewee's perspectives along with an institution's website will assist in evaluating the validity of the proposed e-government stage model.

5.8 Case study projects in the KRG ministries

The KRG has an active commitment from the former prime minister as mentioned in section 5.7 regarding adopting and implementing e-government system. However, this process seems to have been resisted with various obstacles that prevented recognition of the implementation process. If KRG's institutions want to proceed with the implementation process, they will have to overcome the obstacles they experienced such as; strategic plan, ICT infrastructure, legal framework, human resource, public awareness, financial issue, IT skills, digital divide, and security (Coursey et al., 2007; Carter and Bélanger, 2005). In the following section the researcher analyses some case study projects that have been implemented by various ministries in the region. The researcher also attempts to examine these projects in order to identify the barriers that influenced the implementation process. Hence, the findings would help and confirm justifying the viability of the proposed e-government stage model. The case study projects are selected based on their advanced level of the implementation process and that have been attained by different ministries, also the nature of information and services that are provided to stakeholders. The researcher interviewed other ministry officers, but their projects are at the initial stage such as ministry of Trade and Industry, and other ministries did not reveal any information due to the security issue such as ministry of interior.

The selection of only three institutions is based on the importance of implementing projects, along with availability of information that were provided to attain the aim of this research. Each case provides services and business functions to the public based on the institutions' nature. For instance MOP interacted mainly with government (G2G), and business (G2B), also MOTAC provide services to government, and business (G2G and G2B), MHE provide services to citizens (G2C). Therefore the analysis and investigation of the three different institutions' interactions would show the validity of the proposed e-government stage model with

a broad capacity of government interaction and communication with various community sectors.

In this study the researcher identifies the parameters and its functionality of the stages of the proposed model which is illustrated in table 29. These parameters are measured against the activity of websites. These websites are illustrated information, activities, and level of communication of the selected three government institutions. Deploying both content analysis and a proposed stage model will facilitate in justifying the feasibility of the proposed stage model namely; *initial, information, interaction, enhancement, transaction and integration*.

Table 29: summary of website parameters with respect to the proposed stage model

Stage	Parameters	Functionalities
Initial	Network infrastructure, adequate network capacity and its bandwidth, reliable equipments, security devices and software.	Suitable speed, download and upload. LAN, WAN or Wimax**,** Secure hardware, antivirus, , Internet, and software platforms Robust security to not allow unauthorised access. Availability of suitable and easy access website to assist citizens to find information easily**.**
Information	Standard information, activities, news, and language.	Continuous and updated information, news about institutions policy and strategic plan, activities related to projects and any related activity, and language- Kurdish, Arabic and English. Public awareness campaign for new system,
Interaction,	Interactivity, contact information. Dynamic information.	Regular updated information, Proper email, telephone, fax, postal address in conjunction with traditional channels for service provision. Availability of forms for download. Online enquiry for some services. Availability of web-based applications Back-office automation for certain entity
Enhancement	IT training, and reduce digital divide	Raise IT skills for ordinary citizen in general and employees in particular**.** Training courses and e-training courses to reduce digital divide through TV, radio, mobile, PC, other multimedia communication.
Transaction	Two way communication, new technology, and upgraded applications.	Ability to fill out forms and submitted online, and acknowledgement after the transaction occurred. Ability to connect local databases to help to retrieve and store data, and information. Availability of incorporating document management system in order to be able to exchange documents. The ability to allow citizen to register for certain services electronically. Ability to pay online for certain services such as tax payment. Availability, confidentiality and integrity.
Integration	Latest ICT infrastructure, integrated and new version of applications, and integrated management system.	Internet for all, all the above elements should be integrated and developed to achieve one-stop government, e-voting, and e-democracy Availability of submitting application forms and receiving the outcome without visiting offices such as driving license, building permit, and others.

5.8.1 Case study one: Ministry of planning (MOP)

Ministry of planning is one of the important ministries of the KRG, and it is a significant focal point of the international nongovernmental organizations (NGO). This institution provides information and services to government sectors in particular. Therefore it manages a huge amount of data and information used to facilitate the government's business process. Where, in turn, the information is shared between various government institutions. According to the interview conducted with the director general of developmental coordination and cooperation (DDCC) statement, the ministry of planning has implemented three major projects namely website (see www.mop.krg.org) that helps to ease access of information and statistical data regarding the development process in KRI. The web-based database uses an oracle system to provide information about all relevant governmental sectors. Ministry network connects all the departments and agencies together, in order to facilitate in data sharing among ministry entities seamlessly. In the following sections the researcher analyses only the website and the ministry's network, due to its mature implementation process and their success according to DG perspective.

5.8.1.1 Ministry of planning website

According to the interview conducted with DG of the DDCC, the ministry of planning's website was designed and went online in 2009 for the first time with a budget of 15.000 US Dollar by a Kurdish private company. However, the website was not active and did not meet the ministry's demands. Therefore, the American company called synergy re-designed another website for ministry of planning in February 2011with a budget of 6.000 US Dollar which was sponsored by UNDP. The screenshot of the website is illustrated in figure 28.

Figure 28: Ministry of planning website

The researcher observed that, despite spending a lot of budget for website design, the website redesigned again with less budget by foreign companies. This is due to a lack of effective IT companies in the region and shortages in IT professionals. The website mainly consists of many parts such as strategic plan, government investment budget, international cooperation, regional statistics, human resource development, and company's class. The main objective of the website is to provide news, data, reports, activities, and information to stakeholders accurately and transparently. It tries to bring in the instrumental role that the ministry plays in sustaining the inclusive evolvement process in KRI, also identifying the images of the KRG in changing the region into a modernised knowledge-based economy. However, this website is not an accurate website for e-government due to lack of proper structure for an e-service gateway. This website only provides information and some statistical data along with ministry's activity.

In terms of technological approach, the ministry of planning has established the ICT department to supply suitable IT infrastructure for a government institution by offering the communication technologies to connect entire departments through local area network (LAN). This network assists employees to integrate ministry's business process with the government applications. Keep their basic applications, and offer support in evaluating their IT solution to meet their business process and access the

internet and email. The department is managed by DDCC which is the significant and more active department at the ministry of planning. The structure of the ICT directorate is shown in figure 29.

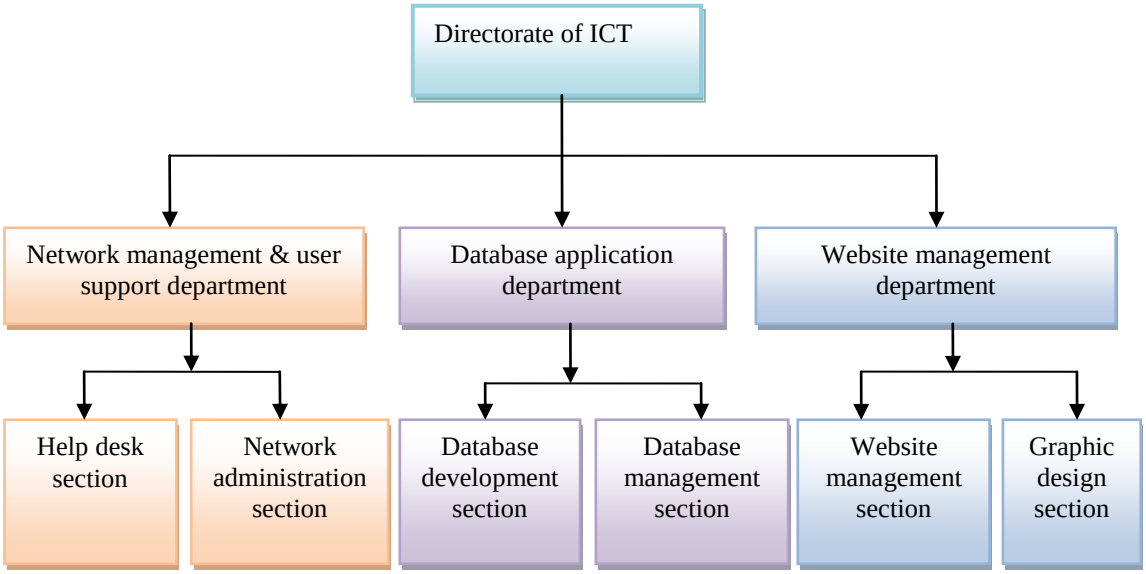

Figure 29: Organization structure for the directorate of ICT at the MOP

The DDCC department has its own website and it is part of the main ministry's website. The website provides information in three languages namely; Kurdish, Arabic and English. The interviewee mentioned that the DDCC department has implemented the first government online application in the region through their website. This application allows NGOs to register with ministry of planning at the KRG. This communication development fulfils the requirements of stage three (interaction stage), in which NGOs can download an application form and send it by email or physically visiting the office for submission. In addition, NGOs can also fill out the form online by accomplishing two-way-communication without visiting offices. With this communication we cannot claim that the MOP stepped to stage five (transaction stage). This is because the back office of the MOP is still not automated and the submitted/received form is checked and approved by professionals who then issue the registration traditionally not electronically. In order to establish and provide seamless e-services to stakeholders there is the need for integration between back and front ends of the system (Christina and Scharf, 2008). The researcher believes that the website of the DDCC is still at the early stage. This is due to it not being easy to determine which characteristics and applications are

most appropriate for building a high operational website. Not knowing how to connect all public authorities to create an integrated service provision which will require a comprehensive ICT infrastructure (Heeks, 2008; Gupta et al., 2008), human resource, management knowledge, appropriate budget, integrated secure system, and project management system, and the KRG suffers from these factors. In addition the lack of qualified IT and administration employees, complexity of tradition system, all affect negatively on the implementation of e-government projects in the region (Coursey et al., 2007; Norris and Moon, 2005). All these have been identified in the proposed e-government stage model in chapter 4.

The researcher believes that technical potentials and network infrastructure are vital factors affecting the adoption process of e-government in the ministry of planning. In order to achieve this goal the ministry should plan for creating integrated ICT infrastructure through the use of more financial resources along with enhancement of employees IT skills. On the other hand, the interviewee stated the opportunity for improving and enhancing the ICT infrastructure to reach the integration system. The MOP developed a web-based statistical database and figures showing local and international organization's surveys such as the UN, World Bank, UNDP, and UNICEF on data and information regarding public sector which was carried out on the KRI and Iraq. This expresses transparency of institutional data; however these publications and data are not available online. This is one of the key elements which might increase corruption and create a lack of transparent atmosphere in terms of information diffusion. In order to help stakeholders to trust in government and make government more transparent and accountable to citizens, the information needs to be available 24/7 (Tan et al., 2005). Therefore, the DG was not satisfied with the web-based application due to its limited functions.

In the contrast through the MOP's website citizens are able to search for some local statistical data and information regarding various government sectors such as population, health, education and others. This will be gained through a data and information centre. Users can enter any keyword in the available online form and the statistical data will be displayed in different formats which could be graphed, data or map. The heterogeneous or displaying some information and others not on the MOP's website is due to a lack of an administration system and lack of active and transparent auditing commissions to follow the updates of information and

disclosing data and information. However, the development of the website project meets some feature of the proposed e-government stage model in particular the first and second stage. Nevertheless, still there is no proper evidence of development of communication across institutions to use the possibilities to reach services' infrastructure via ministry website to offer services to stakeholders. Apart from this, the MOP has not conducted proper efforts to make citizens aware how to use services and information on the website; this is one of the key challenges that impact on the lack of usability of the website as mentioned by senior employees. Therefore, it's vital to promote and make aware stakeholders in order for them to use information and services on the web (Calvin et al., 2008).In affect the interviewees mentioned in this issue, due to the shortage of the financial resources, which means they have not been executed properly.

The DG of this department, in an interview with the researcher, also mentioned the fact that master plan for e-government is not in the ministry's priority. This is because the other government body is responsible on this project such as IT department at the council of ministries. This will lead to assorted efforts from various government entities and thus will create a lack of interoperable systems (Gascó and Jiménez, 2011; Zhao, 2010). In addition, the ministry's website has no legislation or legal framework for unauthorised access to data and information. Lack of legislation and legal framework (Chittoo et al., 2009) to protect business process and citizen's information will encourage hackers to access citizen's privacy, and consequently will influence the lack of trust in government (Conklin, 2007; Ebrahim and Irani, 2005). Furthermore, the lack of electronic verification, identity of authenticated (Alpar and Olbrich, 2005) and legal framework for i.e. contracts and transactions over the internet in most government entities, will also impact negatively on the trust in government. These laws will guarantee a citizen's right to interact electronically with government. However, these laws should be conducted and updated continuously according to states' reality and global standards. In this regard, the proposed model indicated the availability of the legal framework for e-government system and robust legislation and laws to protect stakeholders' information and privacy.

The responsibility of the security team is to ensure the confidentiality of information transmitted and guarantee the privacy of data throughout the transaction process.

Despite this the DDCC website provides a secure user name and password for employees to access the web-enabled database. However the system still has a lack of proper secure application design and development to treat vulnerability, to block unauthorised access, because firewall alone might not obstruct attacks on applications. The system should meet with a rising number of common standards and international regulations; using required tools in order to document the position of the application security. Also to identify and accomplish security risk analysis processes in order to diagnose security issues. The security infrastructure becomes more complex by developing business process, so requires more confidentiality, integrity and availability of transactions. The researcher revealed that the progress of this business process is very slow by both technical and security issues, due to lack of experience and lack of IT skills. Yet most of the ministry's staffs are graduates from universities, and the highest qualification is an MSc. Even though, they are not capable of dealing with certain complex technologies. This highlights the effect of ICT skills in the adoption process (Elnaghi et al., 2008; Lootah, 2005) of e-government at the ministry of planning, which has been clearly stated in the proposed e-government stage model.

Moreover, according to an interview with DG of DDCC indications were that other main barriers/obstacles e-government implementation is the shortages in electricity across the country. Lack of human resources, ICT infrastructure, and lack of awareness of stakeholder for the implemented project along with negative impacts of digital divide amongst citizens in general and employees in particular (Jellinek, 2010; Fuchs and Horak, 2008; Tassabehji, 2005). The interview result also shows that the training courses of government employees are not sufficient even the IT academy has managed to run a Cisco training course for networking but still does not fulfil their needs. The IT academy only runs training courses for government employees not for ordinary citizens and this will affect in broadening the digital divide (Belanger and Carter, 2006). This is because of a lack of a training strategy and lack of investigation for government institutions' desires and public needs.

In terms of the institutional aspect, the dissemination of information on the website is in the English language and most of the Kurdish society in the region does not know the English language. Therefore, the researcher believes that the website should be displayed in the local language (Kurdish) apart from other i.e. English and

Arabic languages in order to encourage citizens to use information and services seamlessly. As mentioned in the proposed model the website should be updated regularly to attract stakeholders to use information and services. The significant issue regarding the website in the region are most of the top managers having no motive and knowledge about website. The main issue is how the management team can identify ways to engineer and re-design the management procedure by using ICT to achieve efficiency (Bowen et al., 2007). This is a significant issue due to lack of information and knowledge sharing among inter and intra government institutions along with lack of training for managers to improve their skills. This issue was observed through the interview, and revealed that there is a lack of management skill about e-government among most of the top managers, advisors and experts. This influences negatively on the explicit and the right decision of IT project (Bowen et al., 2007).

The wide gap between government and citizens along with social and cultural attitudes are also affecting the implementation of e-government (Ali et al., 2009; Stibbe, 2005). For instance, government implements projects for some part of the society particularly wealthy residents and along with providing services without going back to citizen's perspectives and this will create an ample gap between government and citizen. In addition, resistance from ordinary employees' to technology, e-government systems, digital business process and the influence of IT on their job description along with their training (Sarantis et al., 2011), all these challenges affect the implementation of e-government. The researcher believes that this is due to change in their traditional situation (Longford, 2002).

Another issue facing the MOP is the lack of an awareness campaign (Zhao, 2010; Janet, 2004) to encourage the public and government institutions to participate in developing the strategy of public services. Also unavailability of an accessibility policy across the region, and the researcher believes that this issue will be overcome by practising the following strategies. Train the IT personnel on web site use, enhance a management awareness campaign about the value of website accessibility, and free phone calls on the website to increase accessibility (Abanumy and Mayhew, 2005). Another issue which influences the activity of the website is the lack of evaluation and testing the process of the website and other three projects launched at the ministry. As stated in the proposed model at the end of each stage, the process

should be evaluated and tested in order to identify the validity of the business process at each stage. Therefore it is important to evaluate and test the implemented project in order to know the feasibility and the degree of successful of the project (Wang et al., 2005), and initiate a contingency plan to overcome any problem during implementation.

5.8.1.2 Communication network for ministry of planning

The DDCC department managed to conduct four main IT projects for the ministry of planning namely a ministry portal, ministry network, web-based database, and recently in an effort to start with implementation of the Kurdistan development management system (KDMS). This project facilitates in providing services and information to the entire government bodies and citizens and hence will help the KRG to start the initial phase towards an information society (Kliček and Vukovac, 2007).

In this section the researcher examines the communication network of the MOP. In terms of technological approach, an interviewee believes that the networking infrastructure is vital in order to connect the entire ministry's department to share data and information. In 2010, the DDCC at the MOP managed to establish a communication network. This network connects approximate 150 computers with some other pertinent equipment such as domain server, printer, scanner, e-mail server, web-based database and other applications. The structure of the ministry network is illustrated in figure 30.

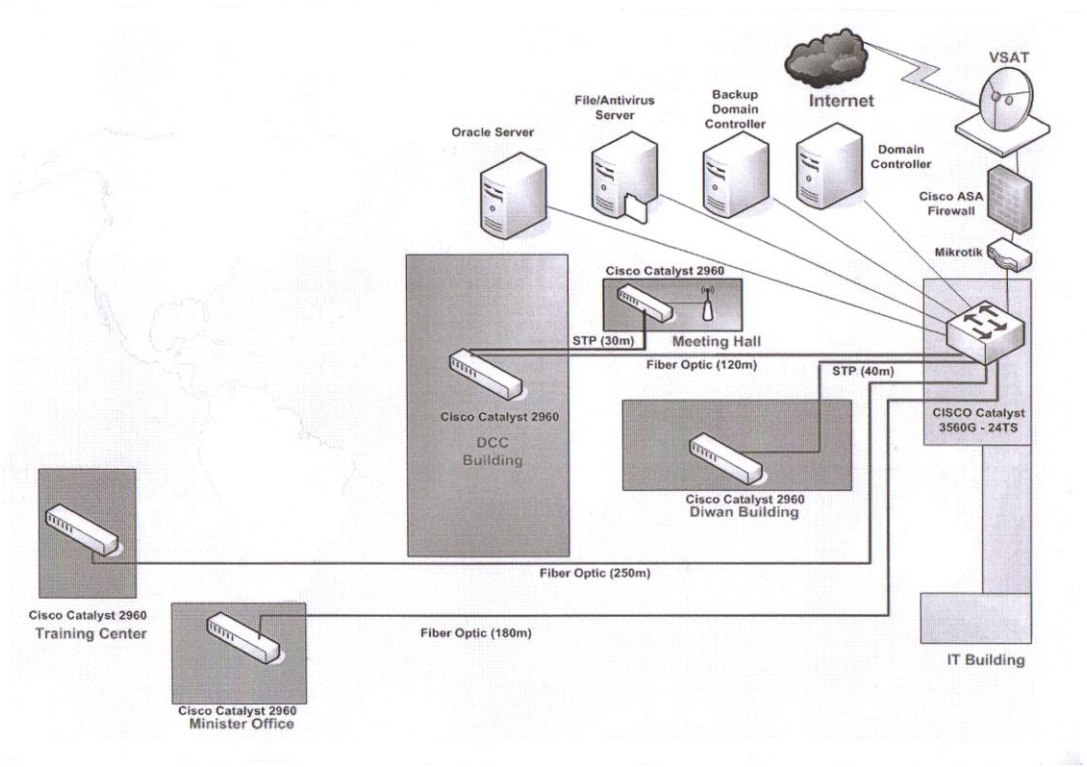

Figure 30: Ministry network (MOP archive)

From figure 30, it can be observed that the network comprises of four types of server such as Domain controller, used for security reasons, in other words it responds to security authentication requirements such as checking, logging in, allowing the user accessibility. The second server is a backup domain controller which is used to save and copy the entire user accounts database. The third server is an antivirus server, it is used to run antivirus software in order to protect, detect, prevent, and take action to deactivate or remove malicious software programs entered into the network. The fourth server is an oracle server that comprises of an integrated and standard based software platform used to run and construct applications such as oracle. This network is connected to the VAST in order to receive internet services, which are provided by local ISP (Tarin Net company). The network is protected by a Cisco ASA firewall to allow or reject network transmission based on certain rules and regulations also used to protect the network from unauthorised access. The network also includes a Cisco catalyst 3560-24TS switch that is used for small virtual LAN access or branch-office environments. However, the researcher believes that this switch is not efficient to cover all these equipments in the ministry, and therefore the

network might not work effectively. Five switches (Cisco Catalyst 2960) are connected to the main switch and each switch is located at a certain building to connect computers and other affiliated devices. As it can be observed, due to large areas of the ministry some buildings are connected via fibre optic which will facilitate in upgrading the network in the future without changing the type of the cable. Through this network, government staff can share folders and files among departments. However, this network is used only for the internet and not used for business process or any electronic transaction. On the other hand, each staff has a specific email account that allows them to communicate with intra and inter government institutions. However, there is no electronic business process to enable employees to use their email. All the transactions occur traditionally by allocating a particular employee to take/bring files from/to other government institutions. This is because of the lack of IT skills among employees who made no use of emails and other e-channels to perform e-transactions, and only used them for their private issue.

According to the interviewee's perspective, these servers are functioning through an effective operating system such as window 7 which was provided with a genuine license by the IT department at the council of ministries. However, the main issue is the poor quality of the internet and its lack of continuous connectivity (Shirazi et al., 2010). This is due to lack of active auditing, checking and accountability of ISPs companies, also monopolising some ISPs by politicians who don't follow the rules and regulations (Shareef et al., 2011d). In addition, the web-based application such as the database at the MOP is not connected to this network, and could not perform any back-office business process. Nevertheless, this network should be connected to other government establishments via a wide area network (WAN) or Wimax in order to build an integrated network infrastructure to facilitate in automating the governmental business process (Christina and Scharf, 2008). This has been clearly identified at the fifth stage of the proposed e-government stage model.

In terms of institutional approach, based on the interview conducted with the DG of DDCC, the researcher revealed that any IT projects or idea proposed by top managers especially an e-government project across public sector institutions in KRI. It becomes apparent from the investigations of the case study that some of the senior managers, advisors, and experts have inactive commitment and support for the

adoption of e-government projects. This is due to a low level of education and knowledge in the area of IT, and hence a lack of understanding the role of IT and e-government applications in evolving government functions and operations. In addition, there is no clear decision by a government authority (council of ministry) and lack of a particular government body to be responsible for e-government implementation. There are mixed approaches among government institutions, each institution develops its system without collaboration and coordination with other institutions. Additionally, there are individual efforts from other ministries to implement e-government applications. That will create a lack of an integrated strategic plan for e-government implementation (Bowen et al., 2007). Therefore the researcher believes the Kurdish authority should create a council in cooperation with other ministries in the KRG, to plan for a strategic roadmap for implementing e-government system.

Despite some efforts by DDCC in sending some employees to the IT academy to train in order to raise their IT skills, there is a lack of some important IT courses such as computer maintenance, web design, network administration, project management, and others. The fourth stage (Enhancement stage) of the proposed model mentioned the importance of training courses for employees in terms of IT skills to enable them to use the internet, and develop technology in order to perform government transaction effectively. This will be achieved by developing an ICT infrastructure strategy as stated at the first stage of the proposed e-government stage model.

The interviewee also mentioned the fact that the network is built by foreign companies due to lack of IT professionals by the MOP. Despite of financial resources are available to train employees to raise their IT skills. However, there is a lack of management skills by some of top managers to plan for a suitable agenda to overcome this issue. Therefore, the interviewee mentioned the importance of management skills of the some top managers and there are attempts to treat this hurdle, by recruiting managers through their profession and experiences. The overall analyses of both IT projects by the MOP are measured against stages of the proposed model as illustrated in table 30.

Table 30: summary of parameters of the proposed stage model against functionality of case study one

Stage	Parameters	Functionality of Case study one
Initial	Network infrastructure, adequate network capacity and its bandwidth, reliable equipments, security devices and software.	**Partially achieved** Due to lack of infrastructure i.e. inappropriate internet speed Lack of strategic master plan Lack of legal framework
Information	Standard information, activities, news, and language.	**Mostly achieved** -Only DDCC is an active department, other departments have lack of activity. -Display of the website is in English language, should be in Kurdish language Lack of awareness campaign
Interaction,	Interactivity, contact information. Dynamic information.	**Partially achieved** Due to lack of active web-based database Availability of only one downloadable application form Lack of back office automation
Enhancement	IT training, and reduce digital divide	**Partially achieved** Lack of IT training courses for employees Shortage of financial resources
Transaction	Two way communication, new technology, and upgraded applications.	**Not achieved** Attempts are carried out in their future plan
Integration	Latest ICT infrastructure, integrated and new version of applications, and integrated management system.	**Not achieved** Attempts are carried out in their future plan.

5.8.2 Case study two, Ministry of transportation and communication (MOTAC)

The ministry of transportation and communication is one of the ministries in the KRG. This institution, apart from registering, renting, auditing, and controlling spectrums and frequencies for telecommunication companies, also establishes strategic projects such as an access network for establishing G2G integration processes. The ministry also established a project called (*interneti Meeri* in Kurdish) which implies “government internet" which provides internet to the entire government institutions through wireless technology. In addition, the ministry also launched a website in order to provide information to stakeholders, and a communication network at the ministry to connect the entire departments together.

The project facilitates in assisting employees to share information, folders, e-mails to communicate with other government authorities and web-enabled applications. It merges institution's information infrastructure, and thus offers active services to stakeholders to utilise a secure network, hardware and software along with the internet. In the following section the researcher analyses the access network, and the government internet project.

5.8.2.1 Access Network project

The access network is one of the significant multi-services access networks for government projects established by MOTAC. This project was instituted in 2005 by the Huawei Chinese Company with a budget of approximately 18 million US dollars to build the ICT backbone system for the KRG. This project is implemented to connect all government and its pertinent departments through fibre optics and some departments through copper cable. This project has established a strategic partnership to drive the delivery of web-enabled applications to unify the government information infrastructure. Hence creating an integrated system as well as providing the internet to the entire government entities.

The first phase of the project was started in Erbil and Duhok and the next phase will be started in Suleymani. The project includes only 74 brunches, 34 of them are base stations (routing station) connecting 69 main government offices such as, ministries, universities, directorate of nationality, Traffic directorate, banks and others. The main idea behind this project is to connect all the government agencies in order to automate and integrate government's back office system (G2G) and to share information and services amongst government institutions.

In terms of technological approach, the project connects six exchangers which are available in the city of Erbil. Each exchanger comprises of various sub-sites which connect various government institutions together. The structure of the access network project is illustrated in figure 31.

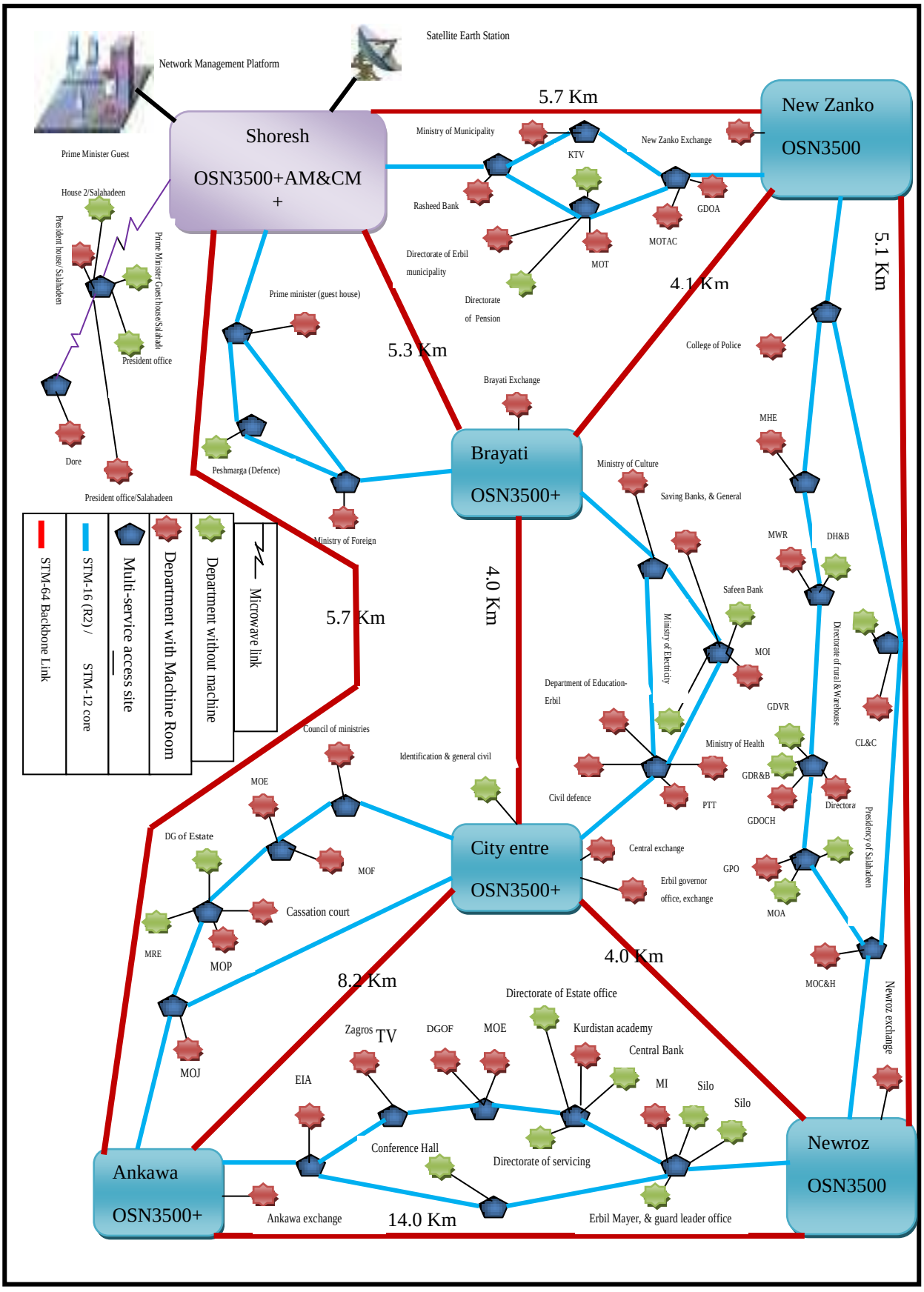

Figure 31: the structure of Access Network project (MOTAC archive)

From figure 31 it can be seen that this project is a strategic and important project that connects most of the KRG's entities together through six main exchangers in the city of Erbil as a first step. Six exchangers are connected through fibre optic with different length depending on the distance between each exchanger for transmitting large amounts of telephone calls and data traffic over the fibre optic cable. The type of the cable is G. 652 fibre with 60 cores; also this cable is used as a backbone with specification of a synchronous transform mode (STM). This is a circuit switched networking approach that established connection between two exchangers before data transfer occurs, and transmitted 64 Kbps (64 thousands bits per second). However, this speed is not a proper speed for tranceiving data and information in today's global development. The researcher believes that the ministry should use alternative developed standards such as Asynchronous Transfer Mode (ATM) which can supply a broad range of bandwidth i.e. from 155.520 Mbps or 622.080 Mbps and the speeds on ATM networks can reach 10 Gbps. Also Fibre Distributed-Data Interface (FDDI) that transmit 100 Mbps and are used for large companies and wide areas, also with this standard there is the opportunity for extending fibre cable is high and might be up to 100Km or 62 miles (see www.searchnetworking.techtarget.com). Between each two exchangers, numbers of multi-service access sites are allocated to transmit voice and data traffic to certain government entities with fibre cable STM G.652 with 24 cores. Each multi-service access sites connect various government departments with a fibre optic cable of STM G. 652 with 12 cores. For instance, Ankawa and Newroz exchanger connected 6 multi-service access sites and 13 government departments. Between Ankawa and City Centre exchanger, 4 multi-service access sites are connected and 8 government departments are connected with similar types of cable. Between City Centre and Brayati exchanger, 3 multi-service access sites are connected and 9 government departments are connected. Between Newroz and New Zanko exchanger, 7 multi-services access sites are connected and 14 government departments are connected. Between New Zanko and Shoresh exchanger, 4 multi-service access sites are connected and 8 government departments are connected. Between Brayati and Shoresh exchanger, 3 multi-service access sites are connected and 3 government departments are connected. The main exchanger which is Shoresh is connected to the satellite earth station in order to receive signals from satellites. Also 2 multi-service access sites are connected to Shoresh exchanger

through microwave line (wireless), and 6 government departments are connected. In addition, a single government department is connected to each exchanger except 3 government departments which are connected to the City Centre exchanger. Consequently, the overall 69 government departments are connected to 29 multi-service access sites, which in turn are connected to 6 exchangers. Further in the Shoresh exchanger, the network management platform is allocated in order to control the access and forward events to other exchangers and also secure the system through an appropriate security technique.

In terms of an institutional aspect, the projects manager at the MOTAC in an interview with the researcher stated that there is no clear and adequate master plan for e-government implementation and particularly for this project. Also mentioned was that the ministry has a proper financial budget, but due to lack of management skills among professional advisors and experts in the ministry, there is influence on the improper decision of any project ,particularly an access network project. Therefore, the researcher believes that for any IT project there requires a suitable strategic plan to follow, in order to create a proper project as stated in the proposed model. The lack of a clear picture by institution's top managers affects failure of the project (Berce et al., 2008). Also the intervention from politicians in government administration, particularly during a tendering time (Shareef et al., 2011d) which affects failure of the project. Therefore, the access network project has been completed in 2007 with vast amounts of budget, but until now this project has not provided any services, and is not used by any government institutions.

The interesting thing is that none of the employees of the executive department know why this significant project does not work. The findings revealed that this is due to lack of freedom in interviewee's viewpoints. In some cases they cannot reveal or are reluctant to disclose negative viewpoints. However, the researcher interviewed senior employees to reveal and disclose accurate information. The interviewee believes there is a lack of budget to install relevant applications and software and extra budget is needed to sustain this project (Rose and Grant, 2010). The researcher believes, according to several interviews with senior employees, this is apart from the fiscal budget problem. There is a lack of coordination between intra government institutions (Ferro and Sorrentino, 2010) and lack of support from other ministries towards the success of this project and hence this might impact failure of this project.

This has been clearly stated in the fourth stage of the proposed model. In order for the success of any IT project, there should be cooperation and support by government institutions and politicians.

In addition, according to the interview there is a lack of qualified IT staff, for instance the highest qualified staff has a BSc in IT. However, there are shortages in qualified employees in business management design and analyses, especially for earlier stages; such as business and management process documentation (Tan, 2005) and its design. Most of the projects which have been implemented have no certain plan, based on the interviewee's prospective this is due to lack of management knowledge (Berce et al., 2008) and lack of strategic plan on what citizen desire and institution's requirements. This can be clearly observed throughout the interview; only two out of six (2/6) interviewees have an idea about e-government models. Furthermore these projects are entirely conducted by foreign and private companies and no participation and viewpoints have been taken into consideration from academics to assist in designing and to enrich the project (Fang, 2002). These important concepts have been clearly identified in the initial and fourth stage of the proposed model. Further interviewees mentioned the effect of culture attitudes by some government employees. For example during the accomplishment of this project, some of the employees in particular institutions are not able to cooperate with the MOTAC due to influences in their security. The reason is improper awareness and knowledge about the project which makes employees unable to understand the idea behind this project. In addition some top managers refused to coordinate with this project at the beginning, due to threats to their position. Therefore, the researcher believes that it is important to conduct a strategic plan to raise awareness and inform all the ministries in order to get an idea of the project and how they might contribute in elevating the project.

5.8.2.2 Government internet project

This project is another strategic project established by MOTAC, which provides internet services to government institutions and associated departments and agencies. This project is a Wi-Fi wireless system with the bandwidth of 5.8 GHz for the cities of Erbil and Duhok.

In terms of technological aspect, the government internet project (*interneti Meeri* in the Kurdish language) consists of three steps, global, regional and local as shown in figure 32.

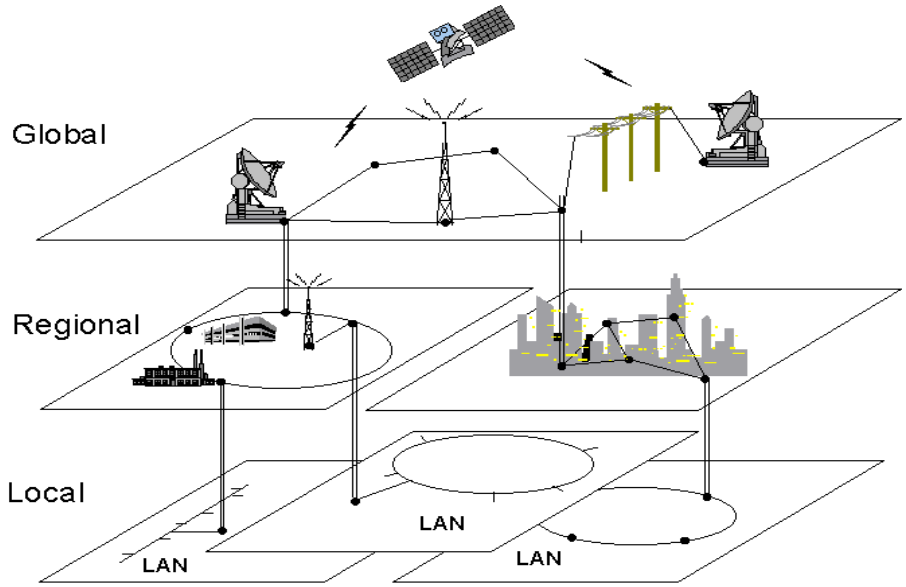

Figure 32: the structure of the government internet (MOTAC archive)

The idea of this project is to connect all government institutions together, and then connect all Kurdistan regions' cities. The Kurdistan region is then connected to neighbouring countries through microwave and then connected to the global system. The MOTAC has assembled various tower stations to build an internet infrastructure for the city of Erbil and Duhok. The project consists of 24 satellite base stations, and 800 routers connected to these base stations to provide internet services to 800 government institutions in both the cities of Erbil and Duhok. The significant parts of this project are to connect base stations to create a strong communication network. In each tower station there are various routers which connect the towers and transmit signals among towers. The city of Erbil's backbone equipments consists of various towers, for example the Wi-Fi tower has a capacity of 5GHz with 90 degree sector antenna, and the second tower has a capacity of 2.4GHz and 120 degree sector antenna. Each tower is connected to a RB 532+564 Mikrotik router, which is used to build a security device with multiple secure channels, and also permits it to build a router firewall with i.e. 9 secure wired Ethernet channels. Then the two towers are connected to a switch type Cisco Catalyst 3524 and this switch is connected to other towers through a network repeater node type RIC/522. However, according to the

multinational corporation Cisco system, this type of switch is not powerful enough due to not handling many VLANs, because it will perform only 64 VLANs at a time. This project consists of more than 64 VLANs. Therefore, the devices should be of high quality to maintain the connection of government data networks properly. In addition, the researcher believes that the implementation of Frame Relay, MPLS, and infrared technologies will influence in supporting the data transmission to reach the high bandwidth i.e. 100 MB (Premji, 2005).

The switch is then connected to the router type Cisco 7204, which receives packets from towers and forwards them to the destination based on a destination IP address. In each city there is a main centre that is connected through a dish with a size of 3.8m which is then connected to a satellite, in turn this will be connected to those of Germany and USA. The sketch of the Wi-Fi technique of the city of Erbil is shown in figure 33.

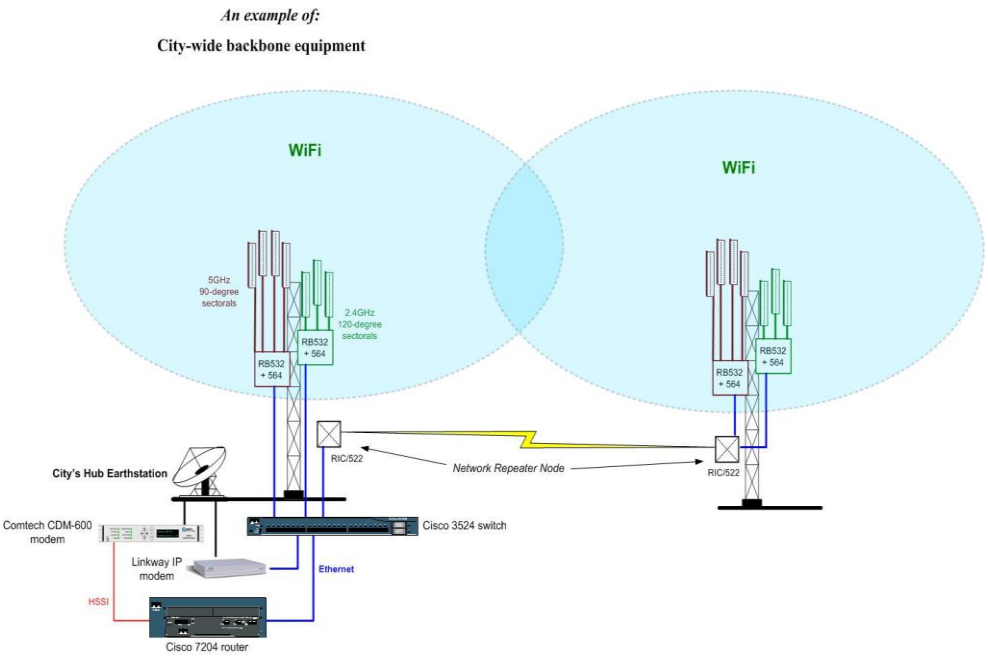

Figure 33: structure of the Wi-Fi technique for Erbil City (MOTAC archive)

This project covers numerous government departments to provide internet services to the main servers in each government department; it does not cover the entire government departments. This is because of the lack of a strategic plan as mentioned by interviewees. Thus creating a lack of networking infrastructure, and the capacity of the project will not be sufficient for connecting the information systems and

applications to all departments within the government, because the KRG cabinet consists of more than 800 departments and entities. Consequently this impacts negatively in implementing e-government systems (Heeks, 2008; Gupta et al., 2008). That has been clearly mentioned in the initial stage of the proposed e-government stage model. Therefore the development of the network and communication infrastructure is vital and must be considered to facilitate in automating back-office of the government institutions at the early stage at least for some institutions as stated at the third stage of the proposed model.

In terms of institutional approach, this project covers only the cities of Erbil and Duhok. This is due to a lack of strategic plan in terms of projects and services between cities in the region. Therefore, it is necessary to provide services to entire cities, based on their needs and city's reality. According to the interview, the government internet project does not provide any information and web-based applications, merely internet service in order to create a unified internet service provider for the entire government institutions. Prior to this project each ministry has signed an agreement with different ISPs, and hence made use of huge financial resources and a lack of unified internet service providers among government institutions. The interviewee mentioned the project's goal in which each government department has an opportunity to receive internet services efficiently and without any disconnecting problems. Even though all the interviewees from different institutions mentioned that the government internet project is still not efficient and suffers from lack of quality in terms of speed and sustainable connectivity. This is due to lack of efficient auditing commission by an executive institution to control and check ISPs to enhance internet speed.

This project is maintained and organised by the Tarin Net Company which provides bandwidth, spare parts and logistic support. The MOTAC has signed a contract with Tarin Net with a budget of 2 million US dollars every three months to achieve these facilities. The researcher believes that these huge financial resources were spent only for maintenance and logistic support, but still the project does not provide what it should offer. This is also due to lack of auditing and checking the company for the services that are provided, along with the lack of IT skills and lack of technicians in most of the government institutions. Therefore, the institutions mainly rely on private companies to carry out projects, and cannot be achieved by government

institutions alone. Despite this the company is one of the best companies in Kurdistan that provides internet services to government and citizens. However all government institutions and citizens are still suffering from poor quality of the internet. Therefore, the researcher believes that the conferred authority should check and audit ISPs in order to treat this hurdle and this has been clearly stated in the initial stage of the proposed model.

Furthermore, the interviewee believes that the privatisation of most projects have a negative impact on the efficiency of the project, and the interviewee also believes that this is due to monopolising some of the projects by top politicians in the country, because most of the large companies are owned by top politicians among most of the main political parties in Iraq. Therefore, these issues are negatively affecting the implementation of the e-government system in the region. The interviewee further revealed that the government authority has not given priority to the strategic plan and legal framework, as well as the implemented project not being inspected and investigated to facilitate the implementation process. Also the lack of consideration of the factors might affect the implementation process, whether the project fails or succeeds (Heeks, 2006; OECD, 2003). These concepts have been outlined in the proposed e-government stage model.

More to the point, according to the interviewee's viewpoint, the main issue in the region is the lack of cooperation and coordination between government entities (Ferro and Sorrentino, 2010. Therefore, this influenced negatively on the delay and improper implementation of the e-government system in the KRI.

The interesting thing is that the government internet project is supposed to provide internet to all government entities in the KRG, but throughout the interview in six ministries with IT managers, the researcher revealed that none of the interviewees knew that their internet was provided through this project. This exemplifies the lack of common information among the interviewees, and hence illustrates the shortages of coordination and cooperation among government institutions. Therefore, the researcher believes that one of the key challenges in the KRG is the lack of collaboration and coordination amongst government institutions and even between departments in one institution and this should be considered and treated carefully (Stibbe, 2005; Fang, 2002).

A further issue in the administrative systems in the KRG is the bureaucratic procedure in any project. Since any transaction or request which needs to be approved or ideas that need to be discussed have to be presented by project leaders to the directorate of department, then to the director of general, and afterwards to the ministry. Finally being posted to the council of ministry and signed by the prime minister. The return procedure takes place for approval or rejection, by that time the implementation of any IT project has already been delayed. These will lead to the delay and the slow development of e-government implementation and a waste of money due to the long bureaucratic procedure. Therefore the availability of the e-government system will positively influence reducing the long process of transactions and bureaucratic procedures of government business processes (Kachwamba, 2011).

The MOTAC has a website that diffuses information and its activities to the public. However, the MOTAC has no particular web-based application, due to lack of IT skills among employees as stated by the interviewee. The display of the website is in the English language, and should be in the Kurdish language, because most of the Kurdish society does not know English. In an interview with the director general of the MOTAC it was stated that the ministry has some views and ideas for implementation for the near future to upload some application forms for telecommunication companies and ISPs to apply for bandwidth and other services. Hence there will be a significant pace towards disseminating interactive e-government services. Table 31 illustrates the overall functionality of case study two against the proposed e-government stage's parameters. From table 31 it can be seen that the MOTAC's website has partially stepped stage 1, 2, & 4 of the proposed model, all except the 3^{d}, 5^{th} and 6^{th} stages which are in their future plan to execute.

Table 31: summary of the stages parameters of the proposed stage model against functionality of case study two

Stage	Parameters	Functionality of Case study two
Initial	Network infrastructure, adequate network capacity and its bandwidth, reliable equipments, security devices and software.	**Partially achieved** Due to lack of infrastructure Lack of awareness campaign, Lack of strategic plan for IT infrastructure, legal framework, and IT skills.
Information	Standard information, activities, news, and language.	**Partially achieved** Display of information in English language
Interaction	Interactivity, contact information. Dynamic information.	**Not achieved** Lack of web-based applications Unavailability of downloadable application form Lack of back office automation Future plan
Enhancement	IT training, and-reduce digital divide	**Partially achieved** Digital divide Lack of IT training courses for employees Shortage of financial resources
Transaction	Two way communication, new technology, and upgraded applications.	**Not achieved** Under development
Integration	Latest ICT infrastructure, integrated and new version of applications, and integrated management system.	**Not achieved** Future plan

5.8.3 Case study three, Ministry of Higher Education and Scientific Research

Ministry of Higher Education and Scientific Research is considered as one of the largest ministries in the KRG cabinet. It manages and organizes 12 private universities, and 13 government/public universities along with various technical institutions and research centres. The attempts towards e-service provision to the public were launched at the establishing time of the MHE in 2007. As an initial phase towards e-government system, the MHE launched building a communication network for the ministry and a website to provide information to citizens and students in particular. These two main projects were implemented by the directorate of the ICT centre, which is one of the active departments at the MHE.

5.8.3.1 Ministry's communication network

The first communication network was established in 2007 with the establishment of the MHE. The aim of this project is to connect all departments of the ministry by facilitating file sharing and enabling employees to communicate with universities and other academic establishments of the ministry. Furthermore it enables the ministry to communicate with other academic establishments across the globe, and provides email accounts to ministry's staff. This project consists of various communication network equipments such as switches, hubs, and servers to build a VLAN to reduce the broadcasting problem and increase the efficiency of the internet. One significant problem in the MHE is that the universities in the region are not connected to the MHE's network. This creates heterogeneous in information diffusion and wastes time, cost, and energy. To achieve a proper network infrastructure requires proper ICT infrastructure to connect all the universities and institutions to facilitate in offering dynamic information and integrated services (Christina and Scharf, 2008; Gupta et al., 2008) and these have been mentioned in the initial stage of the proposed model in chapter 4.

In terms of technological aspect, the interviewee stated that it will not be easy to accomplish a proper ICT infrastructure. This is due to lack of suitable strategic plan and lack of employees with high IT skills along with the requirements of the financial resource to accomplish this project. The strange thing is, most of the library processes at the universities occur traditionally, and the student cannot search or borrow books or journal papers online. Therefore, the integrated ICT infrastructure is necessary (Heeks, 2008; Gupta et al., 2008) to accomplish these important processes for students as well as for academic staff. Also there needs to be software and applications in order to empower citizens and other stakeholders to interact with government services. In addition, according to the interview conducted with director of ICT centre, the ministry have installed a new version of the licensed operating system such as window 7. Along with new antivirus software that was provided by the IT department at the council of ministries. 250 computers are connected across the ministry with two servers for both east and west buildings. The structure of the ministry network is illustrated in figure 34.

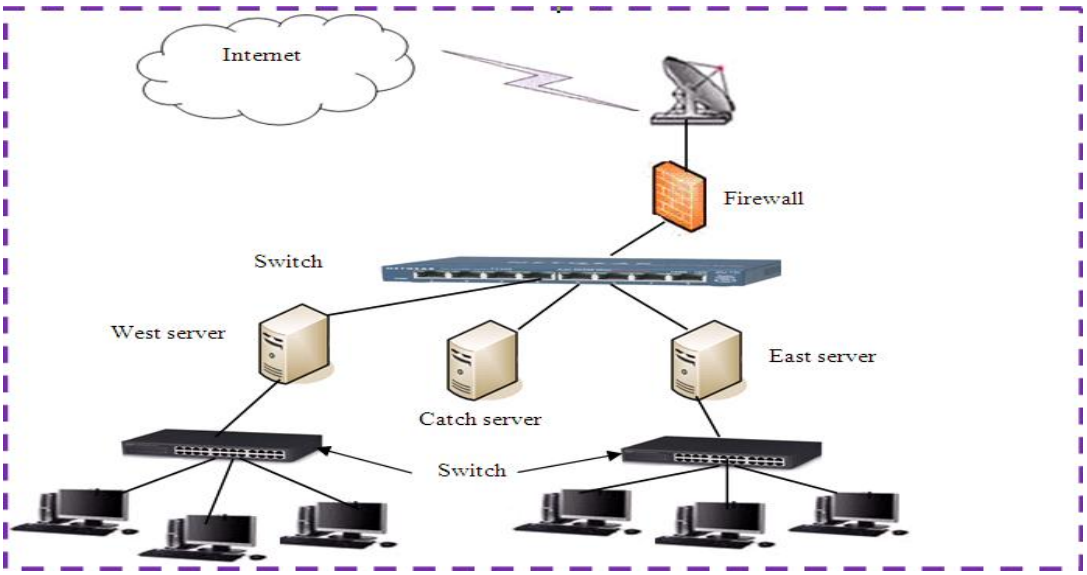

Figure 34: the structure of the ministry network

CCTV cameras are connected to the main network in terms of security to check any suspicious events which might occur inside the ministry. All these computers are connected via two windows server 2008 enterprise. This provides internet services to all ministry staffs and assembles a catch server to speed up the internet. These developments affect change to the quality and speed of the internet. For example, download has been changed from 256Kbps to 1Mbps, and upload from 4Mbps to 6Mbps. However, this speed is theoretical and the received signal is less than this speed also it is not that efficient in comparison to the neighbouring countries. Therefore, the researcher believes, despite these developments there is still the speed of the internet which is not reliable, and there are rooms in the ministry which have no internet, this is due to lack of proper planning along with auditing commission to control the main source of the internet. It requires developing a network infrastructure in order to perform information systems effectively and efficiently (Heeks, 2008; Gupta et al., 2008) along with the enhancement of the quality of the internet from the source.

The other IT project which has a direct connection to the ministry's network is a database, that has been created for any out coming and incoming letters or documents at the reception hall and is connected to the ministry network. This helps citizens to check their transaction process and without needing to go inside offices. However, this database is not web-based database application, so that citizens cannot

access their transaction online. In other words, citizens should physically visit the ministry and find out the flow of his/her transaction. Therefore, the researcher believes that there is a need for identifying citizens for their transaction process (Christina and Scharf, 2008) which has been identified in the fifth stage (transaction stage) of the proposed model. The interesting thing in the region is most of the institutions are attempting to establish e-services. However they don't have any traditional channels of delivery of services such as telephone, ordinary post, or others. Citizens can only physically visit agencies to perform their needs. For instance, the citizen cannot call ministry or any government department officers to acquire information or to identify the process of his/her transaction or at which level it is. Therefore the availability of multi-channel delivery of services is essential to help in providing services to citizens (Shareef et al., 2010a; Bernhard, 2010; Pieterson and Ebbers, 2008; Vassilakis et al., 2007), particularly for KRI, due to lack of e-transaction.

In addition each department at the ministry has a particular database, such as one for HCDP1, two databases for quality assurance and two for the general directorate of scholarships and cultural relationships, another two databases for directorate of administration and archives, to organise data and information of the MHE. However these databases are not connected to each other and cannot be accessed by the entire ministry's' employees. This will also justify the necessity for the fifth stage of the proposed model to connect all these databases together with a robust security system in order to create an automated and integrated system. However, according to the interviewee's statement, this approach will be achieved, and the MHE will have future attempts to conduct some efforts to achieve this approach. The attempts of the centralised database which is facilitated connecting all separated databases in the ministry, in return facilitates to integrate and automate back-office to process all transactions via a single window.

In terms of institutional approach, according to the interview conducted with the director of ICT at the MHE, there is the new minister's attempt to automate the transaction process at the ministry by implementing e-government system. In this regard the ministry negotiated with some private companies to build an e-system in order to digitise all transactions and speed up the flow of operations. This project was unsuccessful due to lack of budget (Rose and Grant, 2010; Norris and Moon,

2005; Scholl and Klischewski, 2007) and lack of IT skills of staff, and could be difficult to achieve at this stage and this is still under discussion. Another issue that impacts on the achievement of this project is the quality of the internet if it is not efficient to accomplish this project, as stated by the interviewee.

The interviewee believes that the MHE has a good relationship with the IT department at the council of ministries in terms of receiving the latest version of the licensed operating system, antivirus software and training for some ICT centre staffs. However, there are not enough training courses for employees in order to increase their potential in terms of IT skills. The interviewee also mentioned the training for the ministry's employees in terms of enhancing employees IT skills. However, there is not enough training for ministry's employees to raise their ability in terms of IT and other applications only some basic training courses such as Microsoft Office, even these training courses are not available now.

The ICT centre also suffers from lack of positive cooperation and coordination within the ministry mainly in terms of information provision (Fang, 2002). For example, when the centre required certain information from certain departments, they had to inform them several times until they provide the information. Externally, for instance, when the MOTAC built the access network project, it did not discuss with the pertinent department at MHE in terms of planning, aims of the project, and the location of the equipments. As a consequence, this might influence failure of the project (Ferro and Sorrentino, 2010).

The interviewee also stated the importance of availability of a plan and legal framework (Gascó and Jiménez, 2011; Alpar and Olbrich, 2005) for any IT projects. But the MHE have not given priority to the strategic plan with legal framework for implemented IT projects; this is due to lack of knowledge about the importance of a legal framework and a strategic plan by top managers and decision makers. Therefore, most of the implemented projects in the region are not continuing and there is a lack of efficient outcome. These concepts are clearly identified and stated in the proposed model.

5.8.3.2 Ministry website

On 18th July 2007 as a first step towards e-government, the MHE website (www.mohe-krg.org) was launched for the first time. This website provides information and services along with ministry's activity to the public but students in particular. However this website has recently changed and been upgraded according to the new ministers' requirements. The new website was launched in 2009; the screenshot of the new MHE website is shown in figure 35.

Figure 35: screenshot of the MHE's website

In terms of technological aspects, as the researcher explained in the proposed e-government stage model in chapter 4, the second stage (information stage) discusses the availability of the active website for government and institutions. This website mostly meets the second stage of the proposed model, because it provides a complete contact list including the minister in the institution, so the user can access the telephone number, e-mail address, and fax number. Also it provides dynamic information and interactive services to the public and academic establishments, particularly students, to apply online for HCDP. The MHE has managed to provide web-based applications to help students to apply for postgraduate courses outside KRI. This project is the strategic project in terms of building and evolving human

resources capable of leading the reforming process of the MHE system to meet KRI's needs. This project is called Human Capacity Development Program (HCDP) and is allocated 100 million US dollar per year. The applicant can apply for this scheme by filling in the application form online. However this application is not connected to the back office. In other words, the employees receive forms and it is processed traditionally not electronically. Therefore with this application the MHE can only step to stage 2, and 3 of the proposed model. The general layout and functionality of the MHE website is as follows:

1- The home page is the main page of the website that divides into horizontal and vertical menu with middle body. The logo of the ministry is located at the middle of the horizontal menu.
2- The horizontal menu consists of several parts such as; the ministry, higher education, quality, policies and audit, scholarship, research programs, returning to Kurdistan region and vacancies. All these parts include sub-parts to help the user to find relevant information easily and accurately.
3- The vertical menu consists of; search this site, and strategic project of the MHE, publications, FAQ, MHE galleries, and recent posts.
4- The middle body which produces latest activities and information including ministry announcement to the public.

On the other hand, the website provides another dynamic application form which assists students to know their eligibility in studying outside KRI. The web-based application allows students to enter their criteria score; the system will calculate those criteria with its scores, which in turn calculate the overall score and displays it on the screen. Thus students are able to know their eligibility before applying for the HCDP scheme. Hence this indicates that the MHE has achieved most of the operations of stage 2 and 3, and partial function of stage 5. On the other side, despite some efforts by the MHE for encouragement and public awareness, there is still a lack of awareness to promote and encourage students to use the available services and help them to fill out this application. According to interview with a senior officer at the ministry, students have difficulties in filling out the form and also the MHE website is not well known by the public. Because the HCDP project is for all government employees, not only for students, it is therefore important to announce this through different channels such as TV, radio, newspaper, magazine, and others

(Elnaghi et al., 2008; Calvin et al., 2008; Lootah, 2005). In order to alert the public of the importance of this project, particularly to make the public aware that all the information is available on the website and through this web-based application can identify their eligibility. As a consequence, this will show the importance of the fourth stage of the proposed e-government stage model and its validity. Therefore, the MHE has met partially to the requirements of stage 5, which directs the MHE to attaining some transaction's operations and services on its websites.

One of the weaknesses of the IT infrastructure in the MHE that has been identified is the lack of security and privacy technologies. While the ICT director MHE revealed some issues regarding security- only the network is equipped with firewall. Firewall alone might not block hackers accessing the unauthorised information, and hence requires other secure applications and software to secure the system. The other senior IT employee stated that the security system is not trustworthy, there are many gaps in the IT infrastructure, and there is a lack of the necessary technologies to protect the ministry's website (Conklin, 2007; Ebrahim and Irani, 2005). Some security equipments and applications are not available in the ministry, such as intrusion detection systems, and biometric systems to avoid interruption in MHE's business process and secure the IT infrastructure and website from unauthorised access. In addition there is a lack of security rules, policies, privacy laws and legal framework for these projects and applications which are very crucial to guarantee and secure citizen's data and information (Bowen et al. 2007; Grimsley and Meehan, 2007; Parasuraman, 2002). Therefore, the security issue is very important and should be considered.

In terms of institutional approach, according to the interviewee, the MHE website is administered by the ministry advisor with two technician employees to update the website. The website is re-designed based on the recent reforms in the ministry but without taking ICT centre's perspective. Therefore the significant challenge in the KRG in general is the decision which will be taken without taking relevant employee's perspectives into account (Verdegem and Verleye, 2009). That impacts negatively in the success of the project, because the participation of relevant employees will enhance, and might improve, the efficiency of the project.

The interviewee also mentioned that they have good support from top managers particularly ministers for any IT projects. However they suffer from lack of training

courses in order to assist their employees to improve their IT skills and maintain and sustain the ICT infrastructure of the institution in a better manner. The top managers should prepare IT courses for their staff and encourage their staff to get involved in workshops and seminars to raise their IT skills as stated by an interviewee. Despite the IT staffs at the ICT centre who are qualified with a degree in software engineering, computer science, and networking, there is still required training for new technology and latest applications. There are some training courses carried out by the IT academy at the IT department at the council of ministries, but still these are not sufficient and do not meet the institutions demand. Therefore most of the IT projects in the KRG are carried out by private companies, even foreign or international companies, and hence will waste vast amounts of financial resources. As a consequence, the MHE has stepped partially to stage 4 of the proposed model.

In addition, the interviewee stated that there is no clear future strategic plan to reduce the bureaucratic procedure for any business process. This is one of the significant challenges in KRG that each transaction goes through various rooms and requires many signatures and, this will impact on the delay of the transaction and waste time and energy. However there is a slight effort and plan by the MHE, which is working on the major project to connect all databases in order to reduce the bureaucratic procedure for any transaction in the ministry. The project attempts to connect all departments' databases to create a centralised database that permits a degree of horizontal and vertical integration and its functionality to process the entire transactions via a single window. The implementation of this project will facilitate a full network of ICT systems and offers the entire related data to all departments and entities in the ministry upon their requirements. This project requires a security control system to secure that the right data is available for the right person. For example, it will also manage who can access the centralised database and who cannot. However this project is still under discussion and requires fiscal budget along with a suitable private company to set up this project. Because the IT staff at the ministry cannot handle this big project, due to lack of experience. However, if this approach is accomplished, it would not lead to achieving the requirements of stage 6, because that requires other government institutions to accomplish similar projects in order to create an integrated system to achieve a one-stop-service approach. Recently the MHE attempted to launch an e-admission system for a

student's admission across the region. This has been achieved through the system called "Zankoline" (see http://zankoline.org) that helps students to fill in the application form online by entering the universities, institutions and subjects that they want to apply for, similar to UCAS. The screenshot of the "Zankoline" is shown in figure 36.

Figure 36: screenshot of Zankoline at the MHE

However the information is presented only in the Kurdish language, and there are many students who are studying in Arabic schools in the region apart from English. Therefore in order to disseminate information and services on the website, the display would be in the local language along with national and international languages in order to enhance and ease accessibility. This system has been advertised and students made aware on the TV and face book for queries in order to assist them to follow the application procedures. However the researcher believes in this important project and in such a developing country, which requires more awareness and encouragement for students to use the new system and hold seminars and workshops to assist them to be familiar with the contents and the application procedures (Coursey et al., 2007; Moon, 2005; Janet, 2004).

According to some student's viewpoints, most of the secondary school graduates have difficulties in opening email accounts. Poor access of the internet, lack of speed, and the cost of the internet; with all these issues citizens need more time to be familiar with the new system. The researcher believes that an awareness campaign

should have been started prior to admission time, in order to give opportunity to students to learn how to use the new system. Therefore currently there are vast accusations on the unreliability of the new e-system (Zankoline). In this regard, the proposed model at the fourth stage mentioned to the awareness of any e-system with providing training courses, workshops, and seminars in order to help participants to learn how to use the system along with its benefits. As a consequence, the MHE with this project will mostly steps towards stage 2, 3, and 4, and partially towards stage 1, and 5. Table 32 shows the overall proposed stages parameters with the functionality of the case MHE case study.

Table 32: summary of stages parameter of the proposed model against the functionality of case study three

Stage	Parameters	Functionality of case study three
Initial	Network infrastructure, adequate network capacity and its bandwidth, reliable equipments, security devices and software.	**Partially achieved** Due to lack of integrated infrastructure among academic establishments
Information	Standard information, activities, news, and language.	**Mostly achieved** Display of information in English language Lack of awareness campaign
Interaction,	Interactivity, contact information. Dynamic information.	**Mostly achieved** Lack of back connection between databases
Enhancement	IT training, and reduce digital divide	**Mostly achieved** Lack of IT training courses for employees Shortage of financial resources
Transaction	Two way communication, new technology, and upgraded applications.	**Partially achieved** Lack of integrated databases
Integration	Latest ICT infrastructure, integrated and new version of applications, and integrated management system.	**Not achieved** Future plan

From the above mentioned analysis, the researcher revealed that the government institutions in the KRG cabinet have several issues which they should consider in order to provide services to stakeholders effectively and efficiently. These challenges are mainly related to both stage 1 and 4 of the proposed model stated in chapter 4, which are technological, and institutional aspects (Coursey et al., 2007; Norris and Moon, 2005; Carter and Bélanger, 2005), and are illustrated in table 33.

Table 33: classification of e-government challenges

Aspect	Electronic government challenges
Technological	Lack of proper network infrastructure
	Inadequate of hardware and software
	Shortages in applications
	Insufficient network bandwidth and speed
	Heterogeneous of databases
	Lack of compatibility between systems and its complexity
	Lack of electricity
	Lack of architecture policy, standard, and requirements
	Unavailability of integrated network system across the country
	Lack of knowledge about e-government model
	Lack of security and privacy
	Threaten from intruders and hackers
	Threaten from malicious, viruses, Trojans, and worms
	Lack of IT companies
	Lack of IT project architecture
Institutional	Lack of strategic planning for e-government
	Lack of legal framework for e-government
	Wide gap between government and public
	Lack of traditional channel for delivery of services
	Inefficient IT training
	Insufficient public awareness of the internet and its usability
	Cultural attitude
	Lack of cooperation and coordination between government institutions
	Intervention from politicians in recruiting IT professionals, and public administration
	Political challenges
	Monopolising big companies by top politicians
	Resistance from some top manager
	Lack of institutional architecture
	Inadequate financial resource for security technologies
	Bureaucratic procedures in government business processes
	Lack of knowledge about security
	Lack of laws and legislation for privacy and security
	Lack of risk management of business process
	Lack of IT security management
	Lack of participation from academic in IT projects
	Lack of trust in government
	Shortages in information and knowledge sharing
	Lack of evaluation process of IT projects
	Lack of contingency plan
	Lack of competition among telecommunication companies

The researcher evaluates the proposed e-government stage model based on the content analysis of the ministry's website in order to show the validity of the proposed model. Also the parameters of the proposed stage model measured against

the outcome analysis of the six IT projects of three main ministries in the region. It can be observed from tables 30, 31, and 32 the MHE is the developed institution in terms of e-government implementation, regardless of some hurdles that have been highlighted. The research findings revealed that there are heterogeneous efforts by government institutions and lack of unified forms of reference to pave ways toward a proper strategic plan for e-government implementation. Therefore, the researcher believes that the proposed model has a potential to achieve this aim.

In order to make the outcome of this research more concrete and reliable, the researcher analysed six government institutions' website such as; the IT department at the council of ministries (www.krgit.org), MOP (www.mop-krg.org), MHE (www.mhe-krg.org), MOTAC (www.moc-krg.com), ministry of trade and industry (MTI) (www.mtikrg.org) and, KBI (www.kurdistaninvestment.org). Table 34, illustrates the activity of websites in 6 ministries with respect to the proposed e-government stage model. To identify the level of functionality of their websites, and IT projects that have been analysed based on the archive documents, report on the websites and interviewees perspectives, and thus will help in justifying the validity of the proposed model.

Table 34: Evaluation of the institutions' website and IT projects with respect to the proposed model

	STAGE 1	**STAGE 2**	**STAGE 3**	**STAGE 4**	**STAGE 5**	**STAGE 6**
Institution	Initial	Information	Interaction	Enhancement	Transaction	Integration
IT department	Partial operations achieved	Most operations achieved	Future plan	Most operations achieved	Future plan	Future plan
MOP	Partial operation achieved	Most operations achieved	Partial operations achieved	Partial operations achieved	Future plan	Future plan
MHE	Partial operations achieved	Most operations achieved	Most operations achieved	Most operations achieved	Partial operations achieved	Future plan
MOTAC	Partial operations achieved	Most operations achieved	Future plan	Partial operations achieved	Future plan	Future plan
MTI	Partial operations achieved	Most operations achieved	Future plan	Future plan	Future plan	Future plan
KBI	Partial operations achieved	Most operations achieved	Partial operations achieved	Partial operations achieved	Future plan	Future plan

The selection of only six institutions is based on the important projects which have been carried out, along with availability of information and services that were provided through their websites. These six websites present the most active institutions in the KRI in terms of diffusion of information and services on the websites. From table 34, it can be observed that all government institutions have a lack of developed ICT infrastructure, this is due to several challenges that are identified in table 33, but their websites are mostly operational. Most of the government institutions are at the early stage i.e. stage two. That shows the progress towards IT culture and e-government implementation is slow. Particularly in that these institutions had not been keen to reveal information due to concern regarding security issues and legacy culture. Their hesitant gradual change during a new cabinet and emerging opposition in the parliament influenced the political reform and promoted to the transparency of governmental information which impacted and encouraged these ministries to provide information to the public transparently. This is a sign of political reform and anticorruption efforts desired to adopt the e-government system.

In this regard some institutions are reaching stage 4, such as the IT department at the council of ministries, which has achieved most of the functions such as IT training for government employees and IT literacy to raise their IT skills in order to reduce the digital divide. However, the IT department has not achieved any functions in stage 3, 5, and 6. According to the interview, the public relations officer mentioned the future attempts to perform certain functionality regarding communication with government entities and citizens online.

On the other hand, the MOP has also attained little function and interactive services to reach the first, 3^{d} and 4th stage of the proposed model. For example, downloadable application forms for NGOs to apply for registration online. However, the main differences between MHE and MOP are such that the MOP has not carried out major operations in the 4th stage, but there are a few efforts to participate IT staff in IT training courses. Furthermore the MOP has achieved little operation of stage one, three and four, and most operations achieved in stage two. According to the interview the MOP is attempting to develop the business process by developing ICT infrastructure and install applications to move forward towards an integrated system.

The MHE has achieved most functions and interaction services to meet stage 3 such as applying for HCDP online. The MHE also attained most functions to reach stage 4 by running some IT skills training in the ministry. Further it sends the MHE staff to the IT department for training to raise their IT skills for new and updated technology and networking courses. The MHE also carried out efforts in alert students and the public to apply for HCDP project online via workshops, face book, and TV. Additionally, the MHE partially stepped stage 1 and 5 through (Zankoline) project, by applying to universities and institutions online and receiving confirmation. The MHE is also attempting to move towards stage six by connecting all the MHE's databases in order to achieve a one-stop-service approach. As a consequence, the MHE is the most developed institution among government institutions in the region, in terms of e-government implementation.

Furthermore, the MOTAC has achieved little operation of the first stage by building its LAN, but without any web-based application. This institution has also achieved most of the functions of the second stage through its website, but offers no function to process forms online or any dynamic services, and there is no evidence of cross-agency integration of the website. In other word, the MOTAC is only at the second stage, which only provides standard information, and ministry's activity on the web. On the other hand, the MOTAC has achieved a significant step towards building ICT infrastructure for Kurdistan regional government institutions in terms of internet service through their two significant projects as analysed in section 5.8.2. In addition, there are some efforts to be carried out to reach stages 3, 4, 5 and 6. According to the interview with the projects manager this effort would not be easy due to lack of a suitable strategic plan and lack of management and consultancy knowledge of some top management.

The Kurdistan board of investment also achieved few operations in terms of ICT infrastructure by building institutions' LAN. Also most operations achieved at the second stage by disseminating institution's information activities and certain services through the website. The KBI has achieved few operations to reach the 1st 3^{d} and 4th stage through the availability of investment license application form on the website. Also efforts have been carried out by advertising and encouraging business companies to come to Kurdistan for investment through various channels such as; TV, newspaper and posters. However, the KBI has not performed any functionality

to step onto stage 5 and 6. This is due to lack of ICT infrastructure in which cannot integrate the back/front office operations to create an integrated system. Therefore it is essential to invest and develop ICT infrastructure and the integration of the system across KBI.

However, there are some efforts by most of the institutions to initiate both stages five and six and improve their ICT infrastructure, along with sending staff to the IT academy for training. But these efforts and wishes are held by some of the senior employees and few top managers, with lack of a unified strategy and approach. Furthermore, each government institution is building its e-government system without cooperation from others. This aim required a high commitment by top level of decision makers at the council of ministries with the proper strategic plan along with legal frameworks. Consequently, the overall arguments and analyses from gathered empirical data, websites analyses, and interviewee's perspectives revealed that most of the investigated institutions are meeting the proposed stage model. Therefore, it is necessary for a strategic model to solve all the aspects that accrued during implementation of the analysed IT project of the three government institutions.

As a consequence, the findings justify the validity of the proposed e-government stage model, and the researcher believes that the proposed model will be one of the best ways to overcome the entire limitations of the implemented IT projects which are illustrated in table 9, and 33 and to pave the ways to implement e-government in the KRI.

Chapter Six: Conclusions and Future Research

This chapter outlines the findings and conclusions derived from the literature research analysis and the empirical data gathered through archive documents, reports on websites and interviews with experts and directors at the KRG institutions. It also presents limitations that occurred during accomplishment of this research along with recommendations for future research in the realm of e-government. The chapter starts with a research impression of the findings, then overviews the limitations and conclude the chapter with recommendations for further research.

6.1Research findings and conclusion

The research findings revealed that the level of internet usability is high compared to the rest of Iraq, but lower than neighbouring countries and the quality of the internet is not that good in order to execute e-services promptly. This is due to the lack of proper auditing and accountability by the administration system of the region to control and check telecommunication companies and ISPs. In addition, chapter 2 outlined the drawbacks and advantages of the current government services. Showing the current government does not provide services electronically. Merely 33% of the respondents are not satisfied, and 22% of them are neutral, while only 13% of them are very satisfied as depicted in figure 14.

In addition, the survey result shows that there are no electronic channels for delivery of services except some tender application on the KBI and *Zankoline* application by the MHE. Further, there is a lack of traditional channels such as telephone, and mail. That implies citizens cannot call any government institutions to ask for information and services or to identify its transaction at any given level. Citizens are always visiting government institutions physically and waiting in a long queue outside buildings regardless of hot or cold weather, in order to perform their needs, and as a consequence they will waste money, time and efforts. The findings revealed that most of the respondents to the questionnaires had a positive approach towards e-

government initiatives to give opportunity to overcome waste of effort apart of money and time.

One of the significant challenges to introducing e-government in the KRI is the lack of IT skills among citizens in general and government employees in particular which is presented in table 9 and 33. Despite this some efforts have been carried out by the IT department at the council of ministries by providing some IT training courses for government employees. Merely 2 out of 6 of the expert interviewees are satisfied with IT academy at the IT department at the council of ministries due to the availability of basic training courses such as Microsoft Office and networking. These training courses are only available for technicians and not for managers and ordinary citizens. The lack of other IT subjects such as security, computer maintenance, green IT, network administration, system design, health and safety, and software development has impacted on the lack of IT skills. The research findings revealed that the significant drawback of the IT academy is that it is only available in the capital of the region and not available in the other cities apart from a lack of various aspects of training. This will impact on the lack of opportunity for government and ordinary citizens in other places to get benefit from IT academy; as a consequence it will increase the digital divide among government employees and ordinary citizens.

The researcher also revealed that the other important challenge is the incompatibility, heterogeneity of the information system infrastructure, and unreliable efforts amongst government institutions towards a unified e-government system. The result will be highly complex and desegregated e-government information systems architecture and thus most of the projects are not fully functioning and not reacting to the standard requirements. The findings further show that some of senior managers were aware of the significant importance of changing business processes and developing the infrastructure of IT as a result of the e-government projects. But there was no serious attempt to allocate a sufficient budget for e-government projects despite repeated requests for additional financial resources from the council of ministries. Therefore, the researcher believes that the insufficient financial resources will influence negatively on the implementation of any IT project. Additionally the researcher also believes that to overcome these hurdles the Kurdish authority should develop a strategic plan along with a developed ICT infrastructure, the proper legal framework, and with sufficient budget. As well as improving the quality of the

internet, and awareness campaigns to encourage stakeholders to enrol in IT training courses, particularly government employees, along with proper systems management.

Moreover, the research findings revealed that none of the analysed e-government models include all the components and elements that are required to be in an optimised e-government model. Most of the models did not recognise the requirement for encouraging, and awareness, of citizens in engaging in e-government. They also merely concentrate on the transformation of government services rather than automation of the working procedure. In addition, most of the e-government models have not considered the potential of multi-channel delivery of services as an alternative form of communication with the government in the case of the failure of websites in order to enable stakeholders to utilise. Most of the e-government models have not prioritised the automation of front/back office in certain government institutions at the early stages. This will assist the speeding up of transaction processing and might add to the success of the e-government system.

The research findings revealed that despite the similarities in e-government objectives between the UK and KRI, there is no potential to copy a developed e-government stage model and adopting into KRI. Due to diverse reasons relating to governmental development such as; ICT infrastructure, legal framework, culture attitude, education level, political process, and others, but lessons can be learned on how to develop the proposed model. Furthermore, as already stated, current models failed to take into account, the challenges faced by developing countries and what follows. Therefore, the researcher proposed a list of key component or elements that would be required to develop a new more appropriate and easy model for this research which is outlined at the end of chapter 3.

Therefore, in chapter 4, the researcher proposed a new, simple, and easy model, as well as being inclusive enough to include the primary ideas of analysed models. The main contribution of this model emphasises the demand side (citizen-focused in terms of participation) and encourages public participation in service acquisition. The proposed model provides steps for e-government implementation of regional government in developing countries and added all the key strength points and issues identified in sections 1.7, 3.1 and 3.2. The most significant challenge in this model occurs mainly in two stages that are different from other e-government stage models,

namely the initial and an enhancement stage as explained in chapter 4. These two stages are very important and ones that have not been considered as a main priority of the models that proposed by any of the international organisations, consulting companies, and individual academic researchers. The other four stages are modified based on the e-government models in the literature along with the KRG objectives, state's reality and citizens' desires.

In the context of the proposed model evaluation, the findings revealed that the probability of strengths and opportunities are higher than the probability of weaknesses and threat factors. The values of both strength and opportunity factors of the proposed model are higher than both weaknesses and threats which is shown in figure 26 and 27. This also shows that there are no major threats or weaknesses that could influence the failure of the e-government stage model for implementation in comparison to strengths and opportunities. The proposed model has a valuable quality with significant factors which might assist in the implementation of the model. This evaluation offers guidelines for practitioners and policy makers alike and also suggested paths for further research. The key findings presented in chapter 5 have implications for other regional governments in developing countries. The combination of SWOT-AHP has not been used yet in evaluating e-government stage model in the literature; which is a unique contribution of this research.

According to the result of the evaluation process which is shown in table 34, the e-government in KRI is still at the early stage since most institutions are between stages 1 and 3. Only MHE has partially reached to stage five by performing little business transactions. The IT department and the MHE mostly stepped stage four, also MOP and the KIB partially have stepped stage four, those concerning IT training and public awareness. The MHE and the KBI, and MOP stepped on stage 3 by performing most and partial business operations respectively, and other advance stages of most of the institutions are in their future plan. From the analysis it can be observed the feasibility and validity of the proposed e-government stage model.

Empirical data from the analysis revealed that a significant issue is the development of projects surrounding the e-government architecture within the institutions that are resisting, with the poor ICT infrastructure, and the lack of IT skills. Further findings points to the lack of a strategic plan for e-government implementation along with a legal framework to protect government and citizens' information from unauthorised

access to e-system. The other significant issue which has been revealed is the lack of cooperation and coordination between government establishments, and these might affect negatively to the successful e-government system. The findings further obtained from analysis confirmed the applicability and feasibility of the proposed e-government stage model in a wide range of government institutions in the Kurdistan region of Iraq, and perhaps in other similar countries due to the justification of the proposed model which had been placed in different perspectives among case ministries such as; the degree of e-government adoption, the nature of service provided by case ministries, the level of interaction, and institutional aspects.

Consequently the researcher believes that apart from the individual efforts from institutions reaching to some advance stages of the proposed model, the unified form of an e-government model is important to pave the way to implement an e-government system effectively and efficiently. Lastly, the researcher believes that the proposed model is an innovative one that enhances the quality of services and business processes in the regional government in developing countries.

6.2 Limitations of the research

Electronic government is no longer optional but necessary for countries such as developing countries attempting better quality of services to their citizens. Citizens are at the centre of the e-government system and play a key role in making e-government successful as well as with the government's policies. However, the implementation of e-government faces numerous different challenges such as technological, financial, political and cultural that must be taken into account and solved carefully by any authority considering its adoption. Several research findings show that, regardless of high financial resources for e-government implementation, various e-government efforts are failing and are progressing slowly. In this regard, the proposed model outlined in chapter 5, can be used as a background theory for researchers. Nevertheless it is limited to the geographical area in which it has been conducted in the city of Erbil (capital of Kurdistan) along with interviews with a small number of government institutions. Therefore, it might be not easy to generalise the outcomes for other regions across the globe.

Another limitation of this research is the lack of information regarding government, due to a lack of statistic census since 1977, and along with the lack of accessibility to government archives and its documentations. Apart from this, some interviewees were not able to provide, and reveal information relevant to the budget and relationship with top managers to the researcher due to sensitivity of their role and position. Further lack of respect for time and meeting is another issue affecting time being consumed in this research. For example arranging appointments with top managers or ministers were very difficult and help should be found in arranging an appointment. Also appointments with some top managers were cancelled due to not knowing anyone or having an intermediary to have an influence on the minister or top manager to accept a meeting. However in one of the case institutions, the researcher was able to interview with the director general who requested a more relevant IT specialist for more interview, this vital meeting provided further important information and data gathering.

In addition, in some case study institutions, the interviewee did not permit the researcher to record his voice and mention his name in the analysis process and thesis. This is due to the concern of the reply by top managers or ministers. Also some directors and managers are hesitant to provide institutions or IT project's drawbacks or negative aspects. This is due to feeling that this would make a bad impression, and therefore they continuously mentioned the strength facets. As a consequence, in some cases, the researcher changed the interview plan, by interviewing lower level management instead of top or executive management. While these middle management levels were more liable to be directly concerned with the implementation process in the institution as well as keen to reveal information and issues.

6.3 Recommendations and further research

Many studies have investigated e-government developments in developing countries. However, only a small number of studies tackled e-government initiatives in regional government in developing countries. This research is the first research investigating e-government adoption in Iraq in general and Kurdistan region in particular. Therefore, for future research it would be useful to investigate e-government

implementation in the context of project management, and implementation operations in regional government in developing countries. This will assist government authorities to know how to assess its information systems with e-government. With this aspect it also recognises the price for e-government implementation in the public division, and this cost can be seen as a direct and indirect cost.

The researcher has referred to the limitation regarding number of samples and limited geographical area of the survey for this research in section 6.2. Therefore, it's recommended for future research that the survey covers a larger geographical area to collect data and information. Also interviews should be conducted with a larger number of IT experts from different government institutions in various cities of the region, in order to obtain an adequate and proper result of the research. Hence, will justify and achieve the aim of the research.

The broad use of technology by stakeholders increases expectations and desires of government. Similarly government authorities are also hands-on in this field and are planning new routes of communication, enhancing services, improving processes, and stimulating democracy by merging new technology. The goal is to become proactive with the interaction and offer better services to stakeholders via e-government. This might be achieved through the use of cloud computing, and therefore it would be useful for future research to investigate in the use of new and advanced technology in e-government development such as cloud computing. With this technology, this includes the use of computing hardware/software infrastructure and its applications which are remotely hosted.

In addition, the trust in government is one of the key elements for the integration and information sharing amongst government institutions. To increase the level of trust, the security and assurance of information systems is essential. This can be achieved by assuring the security of information which adds directly to the raised level of trust among government institutions. Hence, it offers a guarantee of confidentiality, integrity and ease of use of government information. Therefore, the security of government and stakeholders' information is a future research area that would be informative, to propose a framework to complement the information security system.

Furthermore, due to lack of time and resource availability of e-government initiative on KRI, the researcher was incapable of tackling and evaluating in-depth the challenges that might affect the implementation process of e-government. Therefore, it is vital to further research to tackle challenges such as; capacity building, human resources, centralisation, interoperability, formalisation, and citizens readiness to recognise their significance.

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Appendixes

Appendix A: Questionnaires for ordinary citizen

This questionnaire aims to explore issues related to the field of electronic Government as part of a PhD research on e-government in developing countries.

You do not need to give your name, and all questions can be answered with a simple tick to the appropriate box. The information will be treated as confidential and anonymous.

Interview or questions for ordinary Citizens

1- What is your gender?

☐ Male ☐ Female

2- What is your age?

☐ 18-25 ☐ 26-30 ☐ 31-39 ☐ 40-49 ☐ 50 plus

3- What is your occupation?

☐ Student ☐ Businessperson ☐ employee ☐ others

4- Do you have computer at home?

☐ Yes ☐ No

5- Do you use the internet?

☐ Yes ☐ No

6- If yes, where do you access it?

☐ Home ☐ Work ☐ Internet Café ☐ University ☐ Others

7- How much time do you spend online (on the internet)

☐ 0-44 minutes ☐ 45-60 minutes ☐ 1 hour plus

8- Do you use a mobile phone?

☐ Yes ☐ No

9- If yes, what type of services do you perform?

☐ Voice call ☐ Multimedia ☐ Text messages ☐ Internet

☐ Others.....

10- Which of the following channels do you use to communicate with government to receive services?

☐ Personally (physically) going to the office

☐ Telephone call

☐ Letter writing

☐ Mobile phone

☐ Website (Online services)

☐ E-mail

☐ Others.....

11- Do you receive any services from government electronically?

☐ Yes ☐ No

12- If yes, which of the following services do you perform?

☐ Online application form

☐ Online tax paying

☐ Online passport application

☐ Online building licence permission

☐ Online renew a driver's license

☐ Online banking

☐ Online application to University

☐ Online voter registration

☐ Others

13- How long will it take to complete your current transaction?

☐ One to five days ☐ One to two weeks ☐ one month ☐ or more

14- How much money do you spend to complete your transaction?

☐ 10,000-29,000 ID ☐ 30,000-59,000 ID

☐ 60,000-100,000 ID ☐ 100,000 + ID

15- Do you think citizen awareness of e-government services is important?

☐ Yes ☐ No

16- Do you trust online services?

☐ Yes ☐ No

17- Do you perform any completion and submission of business license applications or renewals online?

☐ Yes ☐ No

18- Do you purchase anything through website (online)?

☐ Yes ☐ No

19- Would you be interested in paying your tax via?

☐ Online ☐ mobile phone ☐ physically going to the office

20- Would you be interested in applying for driving licence online?

☐ Yes ☐ No

21- Would you be interested in applying online for house building permission?

☐ Yes ☐ No

22- Would you be interested in applying for passport online?

☐ Yes ☐ No

If you are a student please answer the following questions bellow:

23- What year of studies you are in?

☐ First ☐ Second ☐ Third ☐ Fourth ☐ Higher education

24- Did you apply to University online?

☐ Yes ☐ No

25- Would you be interested in enrolling to Universities online?

☐ Yes ☐ No

26- Would you be interested in accessing the library electronically (online)?

☐ Yes ☐ No

27- Would you prefer electronic learning to class learning?

☐ Yes ☐ No

28- Please give an indication of your level of satisfaction with the current services provided by the government? 1 – very unsatisfied to 5- very satisfied

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

If you are a businessperson please answer the following questions:

29- If you are a businessperson would you be interested in applying online for registration to set up a company?

☐ Yes ☐ No

30- If you are a businessperson would you be interested in transferring your money electronically (internet) or through the use of a mobile phone?

☐ Yes ☐ No

Thank you. For your cooperation, and Please return the completed survey to the distributer.

Appendix B: Questionnaires for employees

This questionnaire aims to explore issues related to field of electronic Government as part of a PhD research on e-government in Kurdistan-Iraq

You do not need to give your name, and all questions can be answered with a simple tick to the appropriate box. The information will be treated as confidential and anonymous.

Interviews or questions for employees

Type of the institution or organization**.....**

1- What is your gender?

☐ Male ☐ Female

2- What is your age?

☐ 18-25 ☐ 26-30 ☐ 31-39 ☐ 40-49 ☐ 50 plus

3- What is your Position?

☐ Employee ☐ Manager ☐ General Director

4- Do you have computer at home?

☐ Yes ☐ No

5- Do you use the internet?

☐ Yes ☐ No

6- If yes, where do you access it?

☐ Home ☐ Work ☐ Internet Café ☐ University ☐ Others

7- How much time do you spend online (on the internet)

☐ 0-44 minutes ☐ 45-60 minutes ☐ 1 hour plus

8- Do you use a mobile phone?

☐ Yes ☐ No

9- If yes, what type of services do you perform?

☐ Voice call ☐ Multimedia ☐ Text messages ☐ Internet

☐ Others.....

10- Does your institution have an Internet website?

☐ Yes ☐ No

11- If yes, how do you see your institution online services in the following categories?

☐ Provide news and information

☐ Online presence and downloadable files

☐ Automated online transactional services

☐ Integrated systems with smaller functionalities

☐ Integrated systems with real one stop shopping

☐ Travel booking services and purchase tickets

☐ Other.....

12- If No, do you plan to develop a website by this year or early next year?

☐ Yes ☐ No

13- Does your institution have an ICT infrastructure that supports you online services plans?

☐ Yes ☐ No

14- If you plan to develop online services what security methods do you plan to use to secure online transactions?

☐ Personal details ☐ Username/Password ☐ Biometrics ☐ Do not know

☐ Other.....

15- From your current work position, what do you think are the main motives behind e-government initiatives in your institution?

☐ Legislative requirements

☐ Technology advancements

☐ Efficiency

☐ Cost effectiveness

☐ Services to citizens

☐ Citizen requirement

☐ Don't know

16- Does your institution have an overall e-government strategy or master plan to guide its future e-government initiatives?

☐ Yes ☐ No

17- Which of the following barriers/obstacles to e-government initiatives has your local government encountered?

☐ Lack of technology/Web expertise

☐ Lack of information about e-government applications

☐ Lack of support from top management

- ☐ Need to upgrade technology (PCs, networks, etc.)
- ☐ Issues regarding privacy
- ☐ Issues regarding security
- ☐ Lack of financial resources
- ☐ Issues relating to convenience fees for transactions
- ☐ Time constraints
- ☐ Issues relating to convenience fees for online transactions
- ☐ Lack of collaboration among departments
- ☐ Staff resistance to change
- ☐ Others.....

18- Does your local government have a separate information and communication technology (ICT) department that is responsible for all information technology needs, including e-government?

☐ Yes ☐ No

19- Do you think that an electronic government initiative will enhance the services provision?

☐ Yes ☐ No

20- As a police officer would you be interested in checking a driver's identities online using mobile phone technology?

☐ Yes ☐ No

21- As a traffic police officer would you be interested in checking the vehicle and drivers identities using mobile phone technology?

☐ Yes ☐ No

22- Do you think citizen awareness of e-government services is important?

☐ Yes ☐ No

23- Do you trust online services?

☐ Yes ☐ No

Thank you. For your cooperation, and Please return the completed survey to the distributer.

Appendix C: Questionnaires for interview

The following letter will be sending to the interviewees to allow me to conduct the interview with them:

Dear Sir/Madam,

Thank you for taking your time to contribute in this research. I really appreciate your contribution and I will be happy to provide you a copy of summary of this research if you want. This interview is part of my research project which is about "Adoption of e-government in regional governments in developing countries: the case of Kurdistan Region of Iraq (KRI)"

The aim of this research is to investigate the opportunity of initiating e-government system for KRI and propose a feasible e-government stage model for regional government in developing countries. The contribution of this research will assist government authorities and policy makers to take into consideration some factors that impact the successful of e-government implementation such as, ICT infrastructure, legal framework, political process, cultural attitude, education level and others. In addition, interviewee's opinion will be taken into account to maximise the benefits and also avoid problems in implementing this model.

I would like to inform you that your contribution is voluntary. The agenda will not be presented to interviewees. The questions will be demonstrated and explained to you by the researcher instead. Feel free for answering or ignoring any question that the researcher asked the interviewee. There is no right or wrong answers, what vital is only your perspectives. The entire information will be treated as confidential and anonymous, so that no one person can be identified. No answers of individuals or small groups of individuals will ever be released.

This research is conducted under the supervision of Professor Hamid jahankhani, Mr Dr. Elias Pimenidis, Professor Mohammad Dastbaz, , and Mr Johnnes Arreymbi, in the School of Architecture, Computing, and Engineering at the University of East London.

With pleasure

Shareef M. Shareef

The strategy of this interview is to gather primary qualitative data from interviewees (experts, advisors, and directors) by using both structured and semi-structured method. The questions are requested, and explained for interviewees by the researcher. The interview mainly accomplished in Kurdish language and recorded, then will be translated into English language. The questions in this scheme are comprises into both close-ended and open-ended questions. The close-ended questions is, the response of the interviewee will be limited to yes| no answer. However, the open-ended questions is, the response of the interviewee will not be limited to short answer, but with more explanation based on the interview question. In other words the interviewee will promote to give detail and explain their answer in a sentence or might be a paragraph or more, in which this type will be the main approach used in this interview.

The significant goals of this type of interview:

1- To collect data and information on the e-readiness and IT infrastructure within public sector in KRG.

2- To recognise the challenges influence e-government implementation in the KRG.

3- To see any institutional, human and technological issues that could influence the implementation of e-government.

4- To examine the implementation process of IT projects in the KRG.

5- To identify any gap between government plan and the citizens' desires of any IT project.

6- This questionnaires interview provides opportunity to obtain experts' opinions to enhance the model which will impact the feasibility of the e-government stage model for implementation.

Institution Name.....

Interviewee Name.....

Department: .....

Interviewee Position.....

1- From your current work position, what are the main motives behind e-government initiatives in your institution?

2- Does your institution have an overall e-government strategy or master plan to guide its future e-government initiatives?
3- In your opinion what are the barriers| obstacles impact e-government implementation?
4- Do you think that citizen-centric based approach is vital to successes e-government?
5- Do you think public awareness campaign of enabling and encouraging citizen to utilise services is crucial? If yes, how. If not why?
6- In your opinion, participation of private companies and academics will influence the e-government implementation? If yes, how? If not, why?
7- Do you satisfied with current role of IT academy in training public and private sector? If yes, how? If not, why?
8- Do you think the quality of internet in the region is sufficient? If yes, how? If not why?
9- In your perspective the decentralised governance of internet will affect the quality of the internet? If not, why?
10- Development of an appropriate legal framework to establish a coherent system and supported by public you think will protect citizens' privacy.
11- As an expert in the field of IT, do you think front and back office automation for certain institutions at the early stage is important? If yes, how? If not, why?
12- Do you think efficient and rigorous management will influence the success of e-government implementation? If not, why?
13- Do you think that the lack of IT skills among stakeholders affects e-government development? If not, why?
14- Do you think that the disparity between government's plan and public demands will influences failure of e-government?
15- Do you think the lack of robust relationship between government and its citizen's impacts failure of e-government?
16- In your opinion, is cultural attitudes influences e-government implementation?
17- Do you think the lack of collaboration amongst institutions affects failure of e-government?

18- Do you think the monopolising companies by politicians influence e-government implementation?
19- Intervention from politicians in government administrations affects the validity and fairness of service provision?
20- Do you think the securing personal information privacy and its confidentiality impact the trust in government?
21- In your opinion, what is required before implementing any new idea such as e-government to institutions in public sector?
22- As an expert, what are the features that will promote government institutions to adopt e-government initiative?
23- What do you think the institutions in public sector need to be able to contribute successfully in the e-government initiative?
24- Do you think e-government initiative will enhance the government's services provision?
25- Do you think there is any resistance from ordinary employee or top manager for e-government implementation? If yes, why? If not, how?

Questions for Case Studies: Any project implemented or at the construction process

1- Do you know what e-government is?
2- Do you have any idea about any e-government model? What about UK model or USA model?
3- What are the most significant influences of ICTs on the structure and processes of government institutions?
4- Do you share knowledge and information electronically or traditionally with other government institutions? If yes, how? If not, why?
5- Do you think your institution has a proper and well developed IT infrastructure? If yes, how? If not, why?
6- Do you think your ICT infrastructure is ready and in a mature status for e-government implementation? If yes, what technology you have? If not, what is the problem?

7- Did you implement any IT project in Kurdistan Regional Government (KRG)? If yes, what are these projects? If not why?
8- When did you launch the first tier toward the adoption of a particular IT project?
9- Is the project have implemented entirely by in-house IT staff? If yes, how? If not, who?
10- Did the project have conceptual framework, or plan for implementation? Copy can be provided?
11- Did the project have a particular architecture? If yes, what is it? If not, why?
12- How is the IT infrastructure of the implemented project? For instance, LAN, WAN, internet, intranet, server type and any application.
13- Does your institution have intranet-based communication as a part of IT infrastructure? If yes, what it is? If not, why?
14- Did you come across any barriers during implantation of the project? If yes, what are these?
15- Does your institutional top administration has a clear picture and understand the important of security systems that should protect IT project?
16- Do you think privacy of information is protected in implemented project such as smart ID card, by law and legislation?
17- What are the security technologies and approach that the implemented project has applied to protect the IT infrastructure and its contents? Such as; public key infrastructure, biometric system, firewall, and others. If not, why?
18- Did the citizen find the project useful? If yes, how do you know? If not, why?
19- Did you get any help or support or advices from academics from Universities in Kurdistan? If yes, which one? If not, why?
20- Did you collaborate with other government institutions? If yes, which institutions? If not, why?
21- Do you think monopolising politicians of companies will affect IT project or any other project? If yes, how?

22- In your opinion, the intervention from politicians to any project or government administration will affect the success of the project?
23- Do you think cultural attitude impacts any IT project, if yes, what are these? If not why?
24- In your opinion, the level of education among citizen impacts the usability of e-services? If yes, how? If not, why?
25- Do you think your employees at the institution are strongly qualified to support IT application and system and they able to solve any complex situation? If yes, what is their highest level of qualification? If not, why?
26- How is the support level from top management in your institution toward the implementation of IT project? If yes, how is their commitment? If not, why?
27- In your opinion, do you believe that the project cost has direct impact to the process of project implementation in your institution? Please explain how? For example: Hardware and software costs, relevant tools and applications, consultancy cost, execution cost, employees training cost, preservation cost, administration and management cost.
28- Are you satisfy with the progress of project that implemented by your institution? If yes, how? If not, why?
29- What is your future strategic plan for e-government implementation in your institution?
30- How important are the following proposed e-government stage model? Do you believe that the proposed six stages are not sufficient for map the development of e-government? If yes, can you suggest other necessary stages for e-government implementation?
31- Do you agree that the proposed stages sequence of the model is the most suitable sequence?
32- In your opinion, can your institution IT employees work and use two implementation stages at the same time, or it is vital to finish from one stage and then begin with next stage? Please justify.

Thank you for your cooperation, and much appreciated

Appendix D: Overall differences among analysed e-government models in the literature.

Author	Gartner, 2000	UN, 2001-2008	World Bank, 2002	Accenture, 2003	Reddick, 2004	Siau & Long, 2005	Andersson & Henriksen, 2006	Zavieta et al. 2008	Lee, 2010
Stages	4	4	3	5	2	5	4	9	5
1	Web presence	Emerging presence	Publish	Online presence	Cataloguing	Web presence	Cultivation	Strategy development	Presenting
2	Interaction	Enhanced	Interact	Basic capability	Transaction	Interaction	Extension	Building infrastructure	Assimilating
3	Transaction	Interactive	Transact	Service availability		Transaction	Maturity	Building trust	Reforming
4	Transformation	Connected		Mature delivery		Transformation	Revolution	Making a physical & electronic portal	Morphing
5				Service transformation		E-democracy		Initial interactions & stimulation	E-governance
6								Enrichment & multi-dimensional development	
7								Prototyping	
8								Integration	
9								Development of the ICT industry	

Appendix E: Summary of the differences between the UK and the KRG.

Issue	UK	KRI
ICT infrastructure	-Developed ICT infrastructure in establishing the internet accessibility for every stakeholder across the country super fast broadband by 2015. -Investment of £830m of public money to upgrade the broadband infrastructure particularly in rural areas. -Virgin media attempts to offer broadband speed of 200 Mbps by 2012.	-Most of the government institutions in the Kurdistan region have a separate ICT department that is responsible for all their information technology needs. There is almost no use of ICT in the interaction of the government with public. - ICT infrastructure in KRG is still under expectation due to lack of efficiency of the internet in terms of speed, cost and, accessibility. -Shortages in telephone land lines particularly in rural areas that will also impact the usability of the internet. - Lack of electricity (frequent cut-off of electricity) in the region. - Lack of competition amongst mobile companies due to the limited number of these companies. - Slight efforts in ICT infrastructure; attempt to connect certain government institution via fiber optic.
E-readiness	-UK is one of the developed countries in the world and ranks fourth in 2010. -Advanced in e-services	-Iraq is one of the developing countries and ranks 136 in 2010. - No such e-services, is at the early stage in e-government implementation. -KRG signed an agreement with Price Waterhouse Coopers in 2008 to create an IT strategy for KRG. - IT academy was started in 2009 for training public and private sector.
Legal framework	-UK parliament has enacted some legislation such as; legislation regarding accessibility. -Strategic framework for public services in the information age, April 2000.	- No legal framework on accessibility or computer misuse or any related aspects.
Cultural attitude	-UK is a developed society. - The penetration of internet exceeds the KRI. - Majority of citizen's trust in government and use e-services. - Equal opportunity approach is higher than developing countries due to liberal and democratic system.	- In some societies the desires of internet is not the issue compared to other priority needs such as food, water, electricity, education health, etc, - The prior issue in Iraq in general and Kurdistan in particular is their security, electricity, food and welfare life. -Internet accessibility is more among males than females. - In a few families using internet is forbidden due to the misuse of the internet
Education level	-UK is at the top 10 in digital opportunity, due to the high IT skills amongst people. - Various organisations in helping and supporting ICT skills and training for private and public sector such as, Skill Set. - The emergence of ICT in education curriculum from primary school to higher education.	- Plan for e-government initiative is weak and do not seem to have engaged the responsible bodies for educating and training required human resource in this sector. - Slight efforts by IT academy to enhance IT skills. -Poverty level impacts the level of education.
Political process	- One of the liberal and democratic countries in the world. - UK politicians cooperated with central government to make a coherent support for their local governments	- New in democratic and freedom process -Politicians controlling public administration, there is ample gap between government and citizen. And Iraq ranked at 175 in the world in corruption according to Corruption Perception Index CPI.

Appendix F: Publications

This thesis provides an account of the research carried out by the researcher. Some of the material included here has been published and presented or under the process in the structure of the following publications.

Shareef, S. Pimenidis, E. Jahankhani, H. and Arreymbi, J. (2011) E-government initiatives for Regional Governments in Developing Countries: A citizen-centred approach in the case of the Kurdistan Region of Iraq (KRI), [Book Chapter], *E-governance and social inclusion book.*

Shareef, S. Pimenidis, E. Jahankhani, H. and Arreymbi, J. (2011) An integration Model for E-government services adoption in Kurdistan Region of Iraq (KRI). *The Electronic Journal of e-Government (EJEG)*, (waiting).

Shareef, S. Jahankhani H. and Dastbaz, M (2011) E-Government Stage Model: Based on Citizen-Centric Approach in Regional Government in Developing Countries, *International Journal of Electronic Commerce Studies* (IJECS)

Shareef, S. Jahankhani H. Pimenidis, E. and J. Jahankhani (2011) Cultivating Transparency and Trust by Adopting E-Government Model in Regional Governments in Developing Countries: The Case of Kurdistan Region of Iraq (KRI), *First World Kurdish Congress conference (WKC),* 7-9 October 2011, Netherlands.

Shareef, S. Jahankhani H. and Dastbaz, M (2011) E-Government Stage Model: Based On Citizen-Centric Approach in Regional Government In Developing Countries, *International Conference on Internet Studies*, September 8-10, 2011, Kuala Lumpur, Malaysia.

Shareef, S. Jahankhani, H. Arreymbi, J. and Pimenidis, E. (2011) 'The Challenges Influencing the Development and Adoption of e-Government Systems Initiatives in Developing Countries', *First Global Conference on Communication, Science & Information Engineering*, CSIE 2011.

Shareef, S. Pimenidis, E. Jahankhani, H. and Arreymbi, J. (2011) An Organizational Framework For Managing E-Government Systems In Developing Countries: The Case Of The Kurdistan Region Of Iraq, *11th European Conference on e-Government ECEG 2010*, Faculty of Administration, University of Ljubljana, Ljubljana, Slovenia, 16-17 June 2011.

Shareef, S. Pimendis, E. Arreymbi, J. Jahankhni. H. (2011) The electronic business model in the context of an E - government model of regional government in developing countries: the case of Kurdistan Region of Iraq (KRG), *proceeding of the Advance in Computing and Technology, January 2011*, pp157-167, ISBN: 978-0-9564747-1-1.

Shareef, S. Pimenidis, E. Arreymbi, J. and Jahankhani, H. (2010) Vision of Electronic Government implementation in Kurdistan region of Iraq, *10th European*

Conference on e-Government ECEG 2010, National Centre for Taxation Studies, University of Limerick, Ireland 17-18 June 2010. Reading: Academic Conferences Limited. pp. 575-584.

Shareef, S. Arreymbi, J. Jahankhni. H. and Pimendis, E. (2010) Multi-channel delivery of services: initial pace towards m-government: the case of the Kurdistan region of Iraq, *proceeding of the Advance in Computing and Technology, January 2010,* pp54-63, ISBN: 978-0-9564747-0-4.